April 8, 1946

STEEL

IC LI
DETROIT

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL CONTENTS, PAGE 55

HNOLOGY DEPT.

INLAND STEEL

Where Resources—Research—
Skill and Service Combine
to give you the Best in Steel

NLAND STEEL CO.
38 So. Dearborn Street, Chicago, Ill.

SALES OFFICES
cinnati, Detroit, Indianapolis, Kansas City,
ilwaukee, New York, St. Paul, St. Louis

RS • STRUCTURALS • PLATES • SHEETS • STRIP • TIN PLATE • FLOOR PLATE • PILING • REINFORCING BARS • RAILS • TRACK ACCESSORIES

8 IMPORTANT REASONS—

Why It Will Pay You to Specify

RELIANCE Series "C" MOTORS

1. **Protecting enclosures** keep out dirt, chips, oil, excess moisture.
2. **Steel stators for strength.**
3. **Thirteen-step winding treatment,** for maximum stator protection.
4. **Pressure cast aluminum rotors** provide trouble-free windings.
5. **Heavy shafts,** liberally designed for added strength.
6. **Precision bearing mount** affords *real* protection to bearings and windings.
7. **Optional lead outlet arrangement** permits machine mounting with elimination of conduit box.
8. **Flange and face type brackets** offer alternative methods of machine application.

Write today for Bulletin C-118 which gives more complete details on these 8 advantages and offers many additional reasons why it will **pay you** *to specify Reliance Series C Motors.*

RELIANCE ELECTRIC & ENGINEERING CO.

1081 Ivanhoe Road **Cleveland 10, Ohio**

Birmingham • Boston • Buffalo • Chicago • Cincinnati • Denver • Detroit
Gary • Greenville • Houston • Kalamazoo • Kansas City • Knoxville
Los Angeles • Milwaukee • Minneapolis • New Orleans • New York
Philadelphia • Pittsburgh • Portland, Ore. • Rockford, Ill. • St. Louis
San Francisco • Seattle • Syracuse • Tampa • Tulsa • Washington, D. C.

RELIANCE A-C D-C MOTORS

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DETROIT

YOU CAN'T SEE THE STRENGTH *But it's there*

Great strength is a basic characteristic of Bethlehem's rolled-and-forged circular products. Naturally, you can't see it by looking at them. But in the tough, gruelling service they give, these products tell you a story that makes good listening: overall ruggedness, greater durability, strength that's *built in.*

For the manufacture of crane-track wheels, gear blanks, sheave wheels, turbine wheels, and similar items, Bethlehem uses a method all its own. Besides imparting strength, it results in several advantages almost as vital—homogeneity, uniformity, frequent savings in weight.

These rolled-and-forged circular products are available in a wide range of sizes—approximately 10 inches to 45 inches, o.d. They will fit easily into your mass-production schedules.* For full details, call our nearest district office, or write Bethlehem Steel Company, Bethlehem, Pa.

** P.S. Bethlehem furnishes these forgings rough-machined, thereby saving a step in your plant.*

SOME OF THE

BETHLEHEM

ROLLED-AND-FORGED

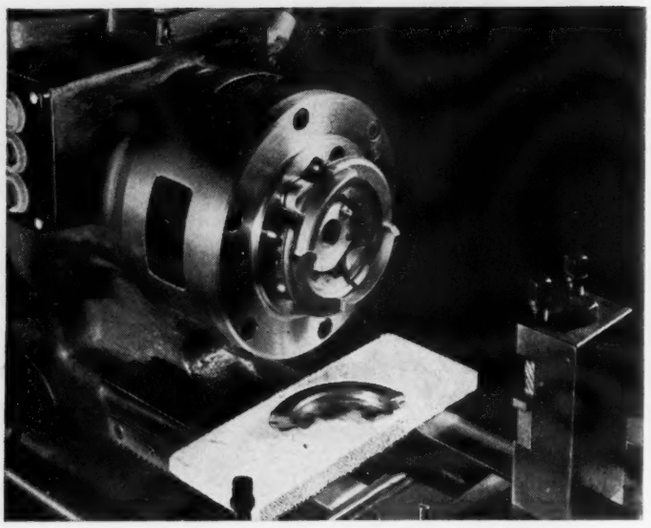
CIRCULAR PRODUCTS

Crane-track wheels
Blanks for spur, bevel, mitre and other types of gears
Turbine wheels
Sheave wheels
Bevel rollers

Furnished heat-treated or untreated; of carbon or alloy steels.

★ BETHLEHEM STEEL ★

A 2450 LB. INDEXING CHUCK *on a Warner & Swasey 4-A Turret Lathe handles several sizes of steel gate valve bodies. The 20° tapered valve seat inside the valve, and the three exterior right angle faces are finish machined; valve seats are inserted and finished—all in one operation.*

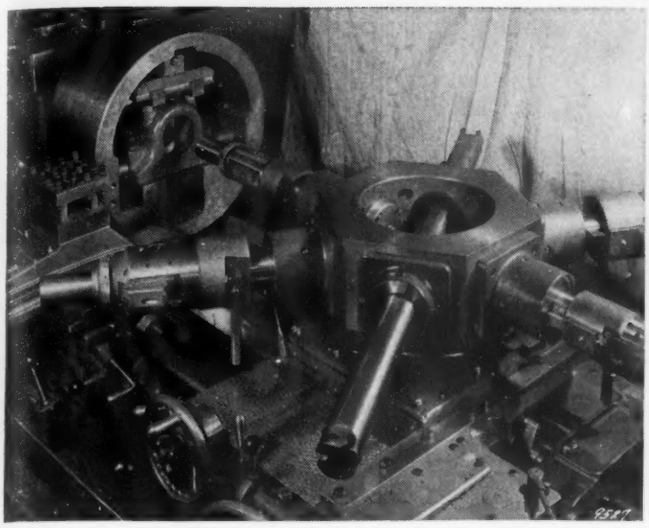


THIS SPECIAL HOLDING FIXTURE *with Air Operated Holding Clamps on a Warner & Swasey No. 3 Universal Turret Lathe machines two typewriter type bar segments at once. Parts are faced, bored, recessed and chamfered on the inside surfaces, and grooved with ball form at bottom on the outside radius—all in one setup.*

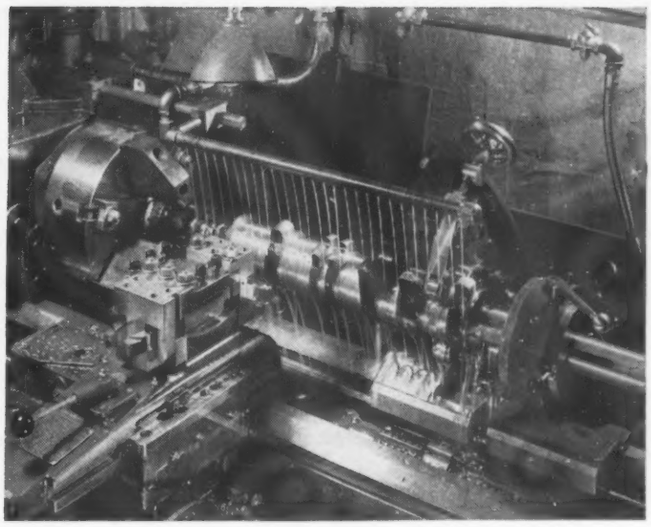
Warner & Swasey offers you assistance on special tooling problems

THE ENGINEERING DEPARTMENT *at Warner & Swasey devoted to the design of special tooling for purchasers of Warner & Swasey Turret Lathes, Precision Tapping and Threading machines, and 5-Spindle Automatics. Here, production rates of tools are methodically estimated prior to manufacture. Special tools are usually tested on customers' samples at Warner & Swasey to make sure that estimates can be met.*

TURRET LATHES, MULTIPLE SPINDLE AUTOMATICS, PRECISION TAPPING AND THREADING MACHINES



SELF-ALIGNING SHAFT BRACKETS *are spherically bored by these special boring bars on a Warner & Swasey 4-A Turret Lathe with Cross Sliding Hex Turret. Bars float axially in flanged tool holders, thrusting against pilot bushing in the spindle. The cutter blocks are rotated inside the bracket casting to machine an accurate sphere to close tolerances.*



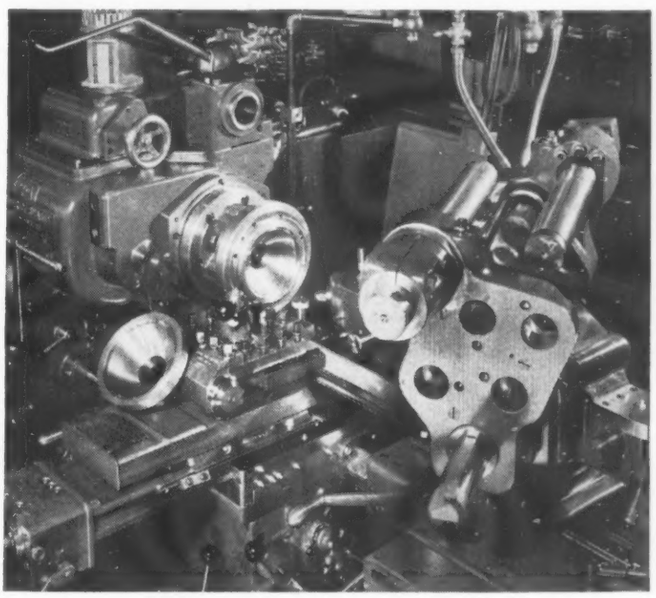
THE TURNING, BORING AND FACING OPERATIONS *on this aircraft cylinder tube are done simultaneously on a Warner & Swasey 2-A Long Bed Turret Lathe. A steady rest supports the steel forging; another supports the external pilots of the drilling and boring bars. Note external coolant supply pipe; oil under pressure is also forced through the boring bars to flush out chips and cool the cutters.*

THE big majority of turning jobs can be handled easily with Warner & Swasey Standard Bar and Chucking Tools.

Every so often however, the setup man or tool designer is confronted with a specific production job which may be produced faster at lower cost with special holding devices, contour cutters, boring bars, cutter holders, etc.

A separate engineering department at Warner & Swasey devotes itself exclusively to such tool design. It can draw upon the experiences of working with many other shops over the years.

Perhaps we can help you by studying your specific jobs and making definite recommendations. Write us . . . or contact your nearest Warner & Swasey branch office.



THE DIFFICULT CURVES *of stainless steel molds for automobile head lamps are machined to a high finish on a volume basis on a Warner & Swasey 2-A Turret Lathe using special tools. Here is shown the setup for turning, facing, boring, forming and spherically facing the concave mold.*

The complete line of standard Turret Lathe tools is described in the Warner & Swasey Tool Catalog. It is offered free to turret lathe users. If you do not have a copy write

WARNER & SWASEY
Machine Tools
Cleveland

YOU CAN MACHINE IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY

BEHIND THE SCENES

with Shrdlu

Short Item Dept.

Our list department, which includes a lot of things other than lists, is currently wrestling with the revised Standard Industrial Classification, just issued by the Budget Bureau. This mighty tome includes just about everything manufactured in the United States, and take it from us, there are some mighty funny things made in this country. As a matter of statistical interest, our people report that the thing with the longest name made by any metalworking firm is a haemoglobinometer and it is manufactured by industry number 3811, which (according to the SIC) makes Instruments, Scientific, Engineering and Laboratory, except surgical, medical and dental. This, to us, seems all very enlightening.

Technology Ala Shrdlu

The engineering department of this magazine, composed as it is of learned experts in the various phases of metalworking, occasionally casts an aspersion or two upon the contents of this page as being slightly on the less learned side, so to speak. So, in a spirit of defiance, we have determined to establish our own department of technical articles, and start off with an important technical opus contributed (but not authored) by no less a person than Mr. E. E. LeVan, president, Haynes-Stellite Co., Kokomo, Ind. Because of space limitations, we had this set in the smallest type our type-mongers have on tap. That also makes it possible for nontechnical readers to skip right over it without missing a thing. We thought it was real interesting, ourselves.

THE TURBO-ENCABULATOR IN INDUSTRY

For a number of years now work has been proceeding in order to bring perfection to the crudely conceived idea of a machine that would not only supply inverse reactive current for use in unilateral phase detractors, but would also be capable of automatically synchronizing cardinal grammeters. Such a machine is the "Turbo Encabulator." Basically, the only new principle involved is that instead of power being generated by the relative motion of conductors and fluxes, it is produced by the modial interaction of magneto-reluctance and capacitive directance.

The original machine had a base-plate of pre-fabulated amulite, surmounted by a malleable logarithmic casing in such a way that the two spurving bearings were in a direct line with a pentametric fan. The latter consisted simply of six hydrocoptic marzelvanes, so fitted to the ambifacient lunar waneshaft that side fumbling was effectively prevented. The main winding was of the normal lotus-o-delta type placed in panendermic semi-boloid slots in the stator, every seventh conductor being connected by a non-reversible tremie pipe to the differential girdlespring on the "up" end of the grammeters.

Forty-one manestically spaced grouting brushes were arranged to feed into the rotor slip-stream a mixture of high S-value phenylhydrobenzamine and 5% reminative tetryliodo hexamine. Both of these liquids have specific pericosities given by P=2.5C.n6.7 where n is the diathetical evolute of retrograde temperature phase disposition and C is Cholmondeley's annular grillage coefficient. Initially, n was measured with the aid of a metapolar refractive pilfrometer (for a description of this ingenious instrument, see L. E. Rumpelverstein in "Zeitscrift fur Elektrotechnistaticha-Donnerblitze" vol. vii) but up to the present date nothing has been found to equal the transcendental hopper dadoscope. (See "proceedings of the Peruvian Academy of Skatological Sciences" June 1914.)

Electrical engineers will appreciate the difficulty of nubing together a regurgitative purwell and a supramitive wennel-sprocket. Indeed, this proved to be a stumbling block to further development until, in 1942, it was found that the use of anhydrous nangling pins enabled a kryptonastic boiling shim to be tankered.

The early attempts to construct a sufficiently robust spiral decommutator failed largely because of a lack of appreciation of the large quasi-piestic stresses in the gremlin studs; the latter were specially designed to hold the roffit bars to the spamshaft. When, however, it was discovered that wending could be prevented by a simple addition to the living sockets, almost perfect running was secured.

The operating point of the Turbo-Encabulator is maintained as near as possible to the h.f. rem peak by constantly fromaging the bitumogenous spandrels. This is a distinct advance on the standard nivelsheave in that no dramcock oil is required after the phase detractors have remissed.

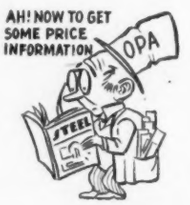
Undoubtedly, the Turbo-Encabulator has now reached a very high level of technical development. It has been successfully used for operating nofer trunnions. In addition, whenever a barescent skor motion is required, it may be employed in conjunction with a drawn reciprocating dingle arm to reduce sinusoidal depleneration.

Well, with that off our chest, we promise to get back to our normal, light and frothy prose. From now on, the engineering department can carry on—we're through!

All By His Lonesome

The English language as she is spoke is an ambiguous thing. That's why we have so much fun with puns and other simple wit. The other day, for example, a gentleman came to call on one of our boys, here in the Penton Bldg. Under ordinary circumstances, the gal who announces callers gives name and company connections. On this particular occasion she merely announced the name, but not the company. Not recognizing the guy's handle, our boy immediately asked the receptionist, "Who's he with?" Right away she came back with, "Oh, nobody. He's by himself!"

Fustest With The Mostest, That's Us



Despite the fact that our editors are a modest lot and curl up around the edges like an oyster in a stew when we mention the kudos they receive for the good job they do, we can't resist the temptation to give them a little publicity now & again, like this quote from a letter just received, "I know now where to go when I want really up to the minute news—STEEL. You have been scooping the town on price information and have the news before the local OPA office does." Which we have been doing, too—for the benefit of all you readers.

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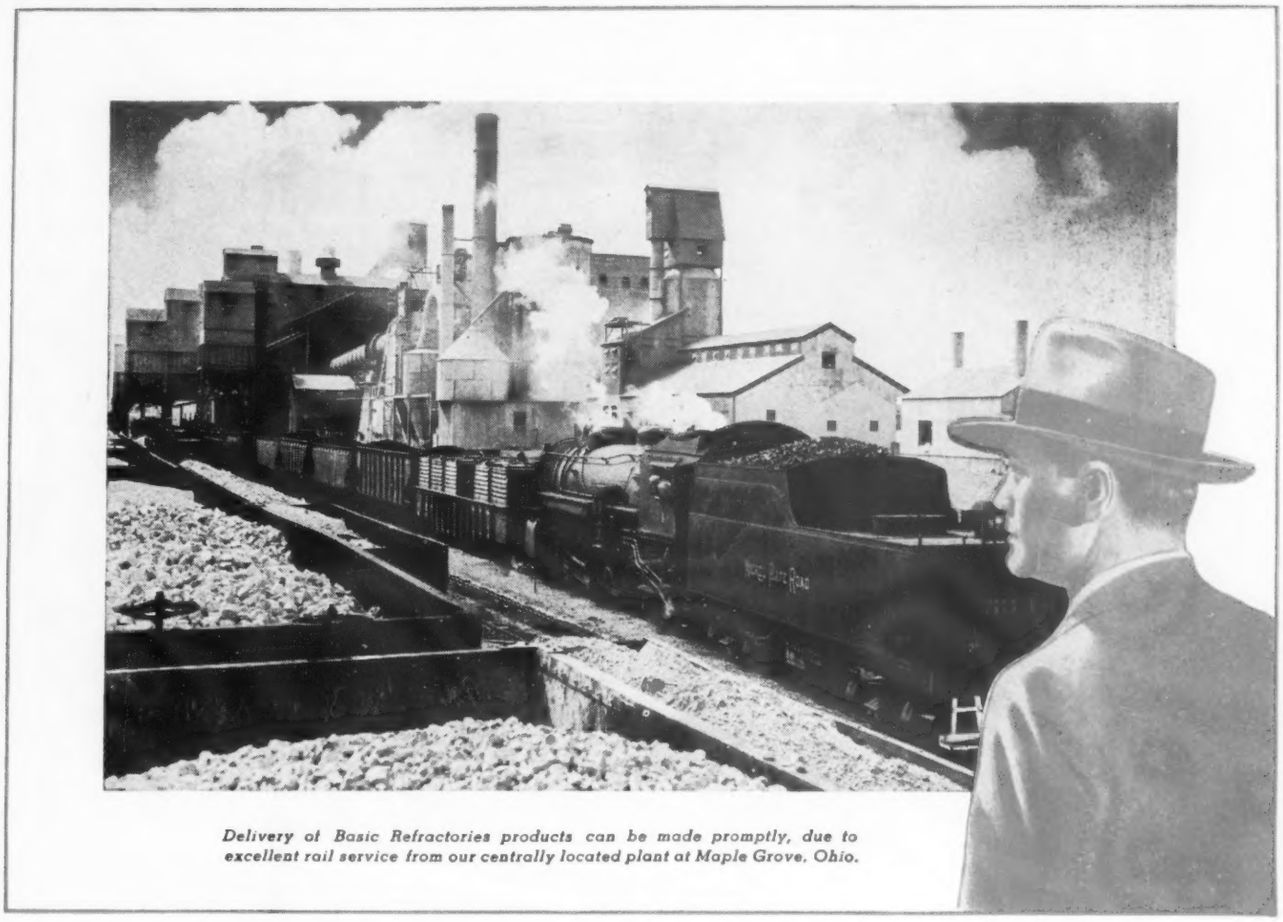
(Editorial Contents—page 55)



Delivery of Basic Refractories products can be made promptly, due to excellent rail service from our centrally located plant at Maple Grove, Ohio.

REFRACTORY SERVICE JUST A TELEPHONE AWAY

BASIC Refractories, Incorporated is ready to serve the steel industry, in its job of making more and better steel for America's postwar needs.

Adequate reserve stocks of Magnefer, Syndolag, Basifrit, Ramix, 695 Plastic, Gunmix and our other granular magnesia refractories for furnace construction, repair and maintenance, are carried for shipment to meet emergency or regular needs. Our strategic location, near the geographical center of the steel industry, with good railroad and highway facilities, enables us to make prompt deliveries.

Basic Sales Engineers are men with steel-making experience, backed by intimate, practical knowledge of refractories. They are available for consultation in your office on short notice. So think of Basic Refractories, Incorporated as YOUR refractory headquarters, only a telephone away.

BASIC REFRACTORIES, INCORPORATED

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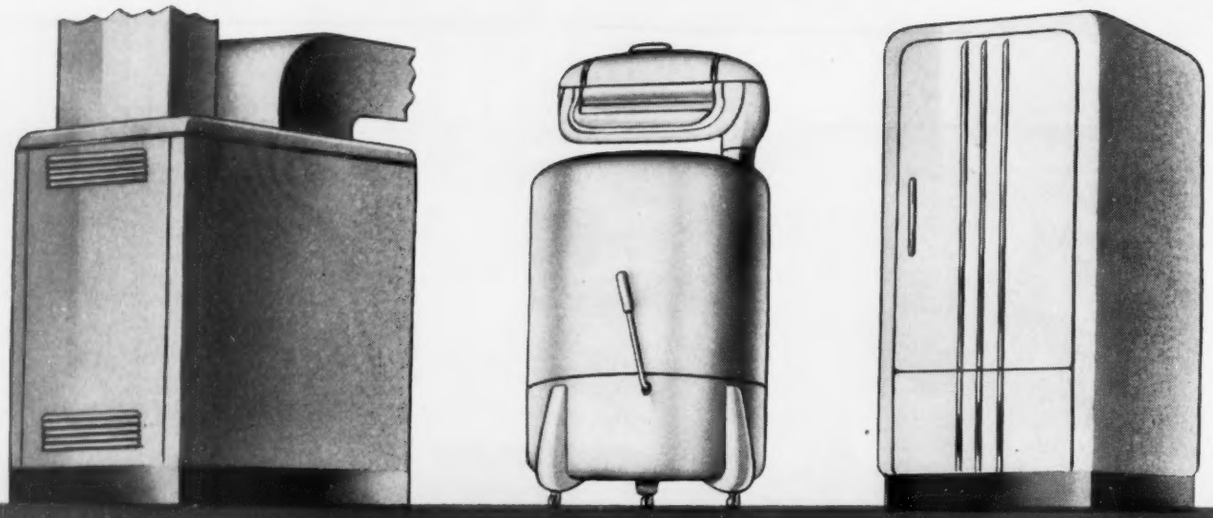


Beauty that is more than SKIN DEEP

Bonderizing assures lasting fine appearance

It is most important to your customers to know that the fine finish on your product will endure. With Bonderizing applied before the enamel you can assure them that the beautiful appearance is more than "skin deep."

Buyers know that finish permanence is vital to continued pride and satisfaction. They have come to recognize that Bonderizing is the best known method of assuring long-lived paint finishes on iron and steel. Its paint-holding and rust-inhibiting effectiveness is proven by years of use.

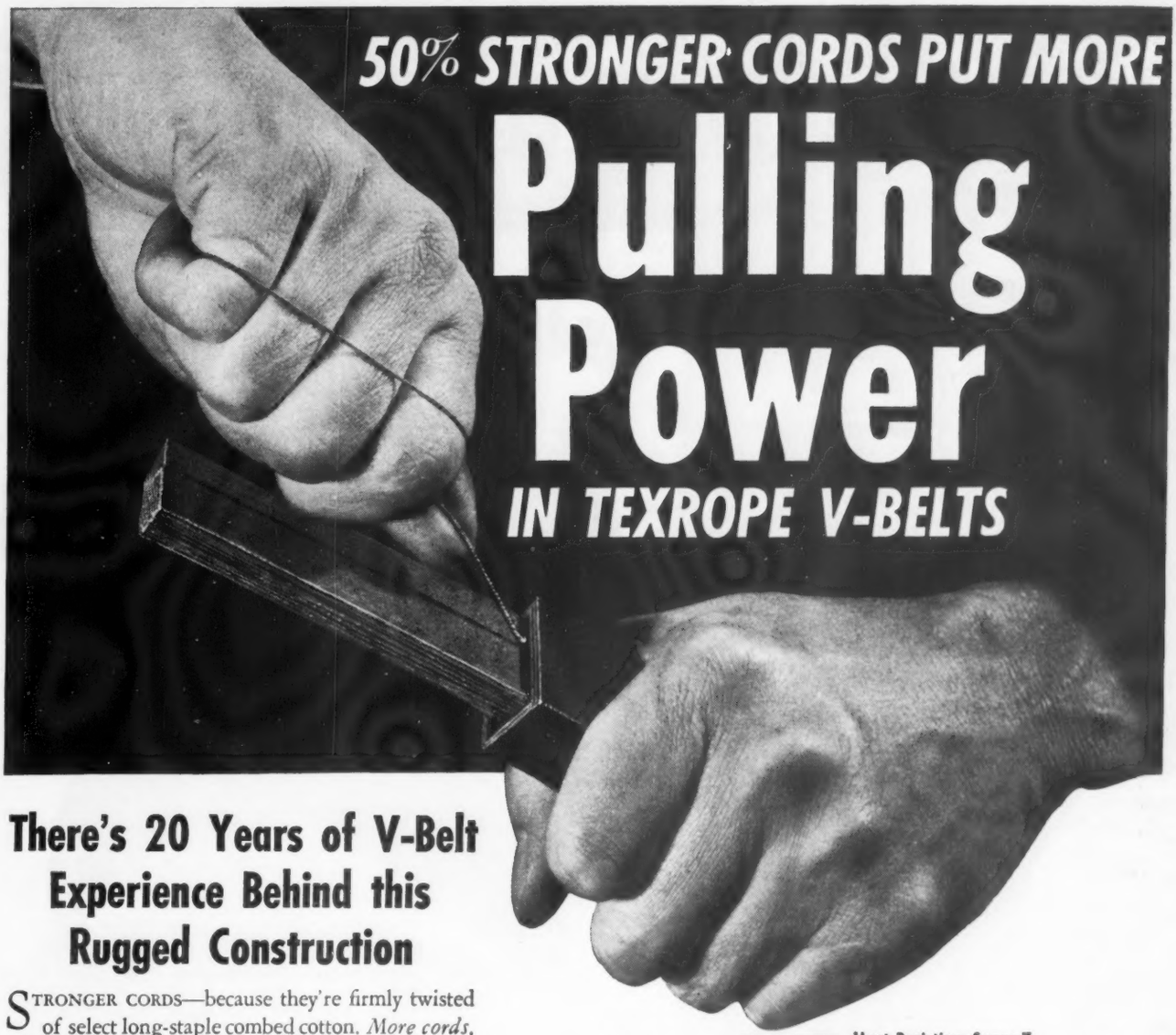
PARKER RUST PROOF COMPANY • 2158 E. Milwaukee Ave. • Detroit 11, Michigan

PARKER PRODUCTS CONQUER RUST

BONDERIZING • Holds Paint To Metal

PARKERIZING • Inhibits Rust

PARCO LUBRIZING • Retards Wear on Friction Surfaces



50% STRONGER CORDS PUT MORE Pulling Power IN TEXROPE V-BELTS

There's 20 Years of V-Belt Experience Behind this Rugged Construction

STRONGER CORDS—because they're firmly twisted of select long-staple combed cotton. *More cords,* too — accurately placed to carry heavier loads, and impregnated with gum rubber to absorb friction and heat.

Texrope "Super-7" V-Belts today are the finest in 20 years of continuous development by Allis-Chalmers—originator of the multiple V-Belt drive.

LONG WEARING — COOL RUNNING

Tough duplex cover to take the wear, keep the belt in shape. *Thick cushion* of war-proved Buna-S to protect the cord structure from shock. *Precision molding* to assure accurate section and a smooth running belt. For long service and highest efficiency on ALL V-Belt drives — make A-C your V-Belt headquarters! ALLIS-CHALMERS, Milwaukee 1, Wis.

WHICH OF THESE SUPER-7 V-BELTS DO YOU NEED

TEXROPE offers you the most complete line of V-Belts — types specially developed to meet ALL operating conditions. Pick the right TEXROPE Super-7 V-Belt — it'll give you the most in efficient power transmission.

Heat-Resisting Super-7
Stands temperatures up to 180°. The TEXROPE V-Belt for most drives.

Oil-Resisting Super-7
Neoprene cover protects core against moderately oily or greasy conditions.

Oil-Proof Super-7
Made of Neoprene throughout. Use it when the belt must swim in oil.

Static-Resisting Super-7
Recommended where explosion hazard exists. Static-conducting element throughout cover won't wear off.

Super-7 Steel
Twin steel cables, to pull extremely heavy loads with minimum stretch.

GET THEM — through your Allis-Chalmers district office or dealer.

TEXROPE Super-7 V-Belts result from the cooperative research of two great companies—Allis-Chalmers and B. F. Goodrich—and are sold exclusively by A-C.

V-BELTS
TEXROPE complete line — Sizes, types for every power transmission problem and condition.

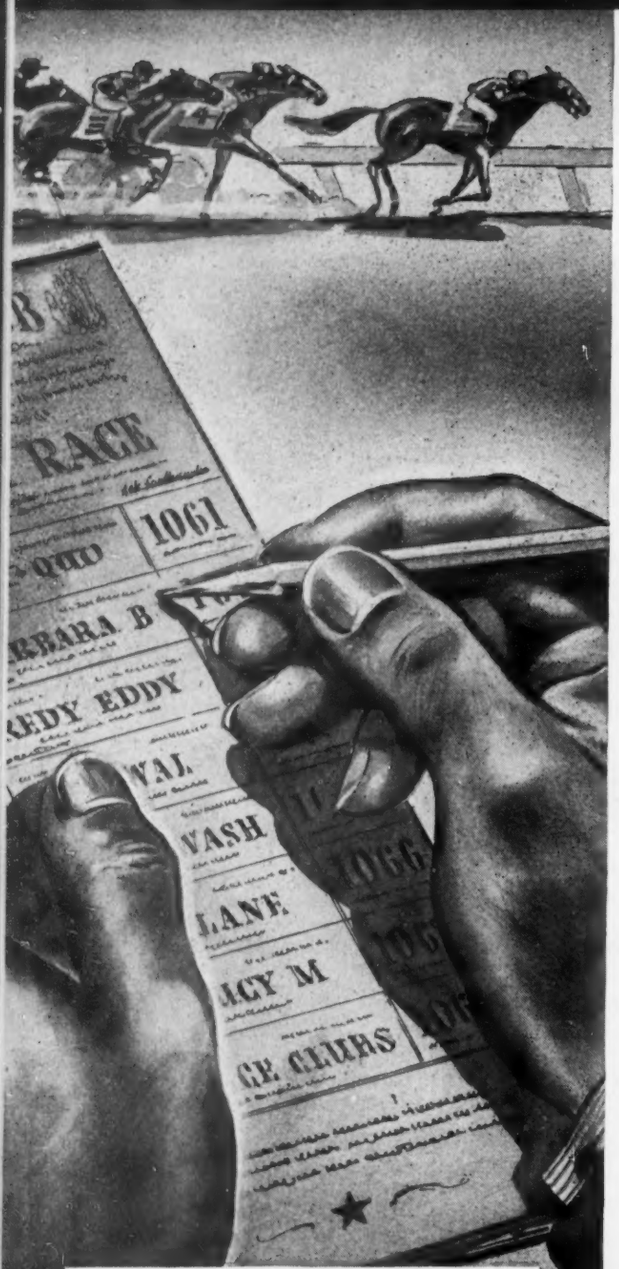
ALLIS CHALMERS
TEXROPE V-BELT DRIVES
ORIGINATORS OF THE MULTIPLE V-BELT DRIVE

SHEAVES
"MAGIC-GRIP" . . . TEX-STEEL . . . TEXDRIVE . . . Speed changers and VARI-PITCH sheaves.

HEAR THE BOSTON SYMPHONY: *Every Saturday Evening, American Broadcasting Co.*

A 2009

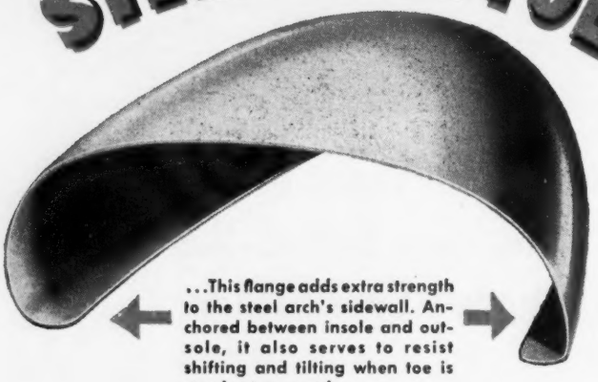
Don't leave it to chance



IN RACING—the pari mutuel odds against the bettor are 10 per cent and "breakage". A thousand men taking $100 each, betting on each of seven races, and betting all of their money, will carry away only $47,831 . . . a loss of $52,169 to the 10 per cent take of the pari mutuels alone.

LEAVE IT TO— HY-TEST

THE SAFETY SHOE WITH THE ANCHOR FLANGE STEEL BOX TOE



. . . This flange adds extra strength to the steel arch's sidewall. Anchored between insole and outsole, it also serves to resist shifting and tilting when toe is struck at an angle.

Workers have the odds in their favor when they wear Hy-Test Safety Shoes. For these are the sturdy, smooth-fitting shoes that put the Indian sign on those toe-injuring accidents which always lurk just around the corner. Hy-Test's Anchor-Flange Steel Box Toe has its anchoring edge well rounded for greater strength. There are no sharp edges to cut through sole leathers and imprison the toes.

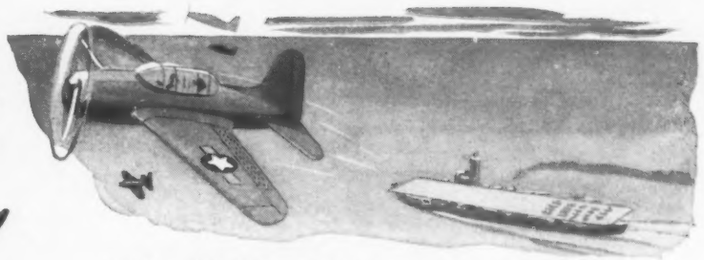
Hy-Test Safety Shoes have a much lighter look and feel than the old-fashioned, bulky, ill-fitting work shoes. They're easy to wear, neat to look at, yet sturdier and more fully protective than any other shoes your workers ever had on their feet. If you would like to know how easy it is to have Hy-Test Safety Shoes available for your workers, just drop us a line. No obligation.

THE WORLD'S LARGEST SELLING SAFETY SHOE

HY-TEST *Safety Shoes*

HY-TEST DIVISION • INTERNATIONAL SHOE COMPANY • ST. LOUIS 3, MO.
EASTERN OFFICE • MANCHESTER, N. H.

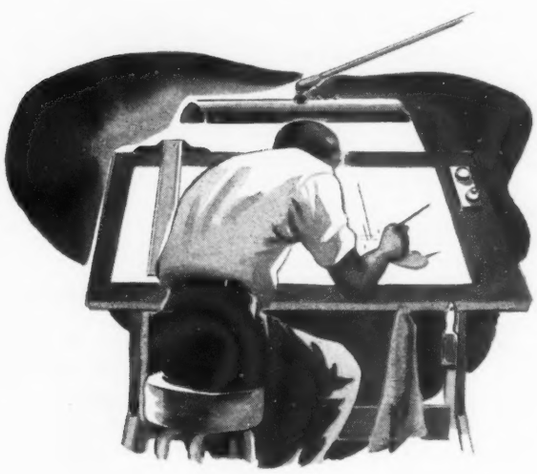
Getting Navy Planes into Air Fast was Job for "Super" Motors!



"What We Want" said Navy, "are ½-hour rated elevator motors that'll lift planes from carrier hangar decks, up at 42 ft, down at 52 ft a minute. And they must be exceptionally dependable — under all conditions — because these planes have to be in the air when we need 'em!"

"Look, Here's What We're Using Now. Two standard winch motors on each elevator . . . doing a good job too. But we want something better. Because *two* motors mean extra space, weight and repairs — things we've got to cut down for more important ordnance."

Whew! High elevator speed, low motor speed . . . stronger . . . lighter . . . smaller — this'll take 6 months to design! Then we rolled up our sleeves, tackled first the problem of developing extremely high torque for fast starting under load — solved it with a special field.



How To Get Light Weight — yet maintain the generous motor design for which we are famous — presented still another problem. This one we solved by skilful substitution of copper for steel . . . of war-proved fabrication for casting. Yes, we cut down weight *and* maintained ample, generous design!

Came the Big Surprise! After we put on finishing touches — special corrosion-resistant marine parts, new kind of insulation — we added up design time . . . just one month! And much-needed motors were rolling off the lines less than 4½ months later.

A 1998

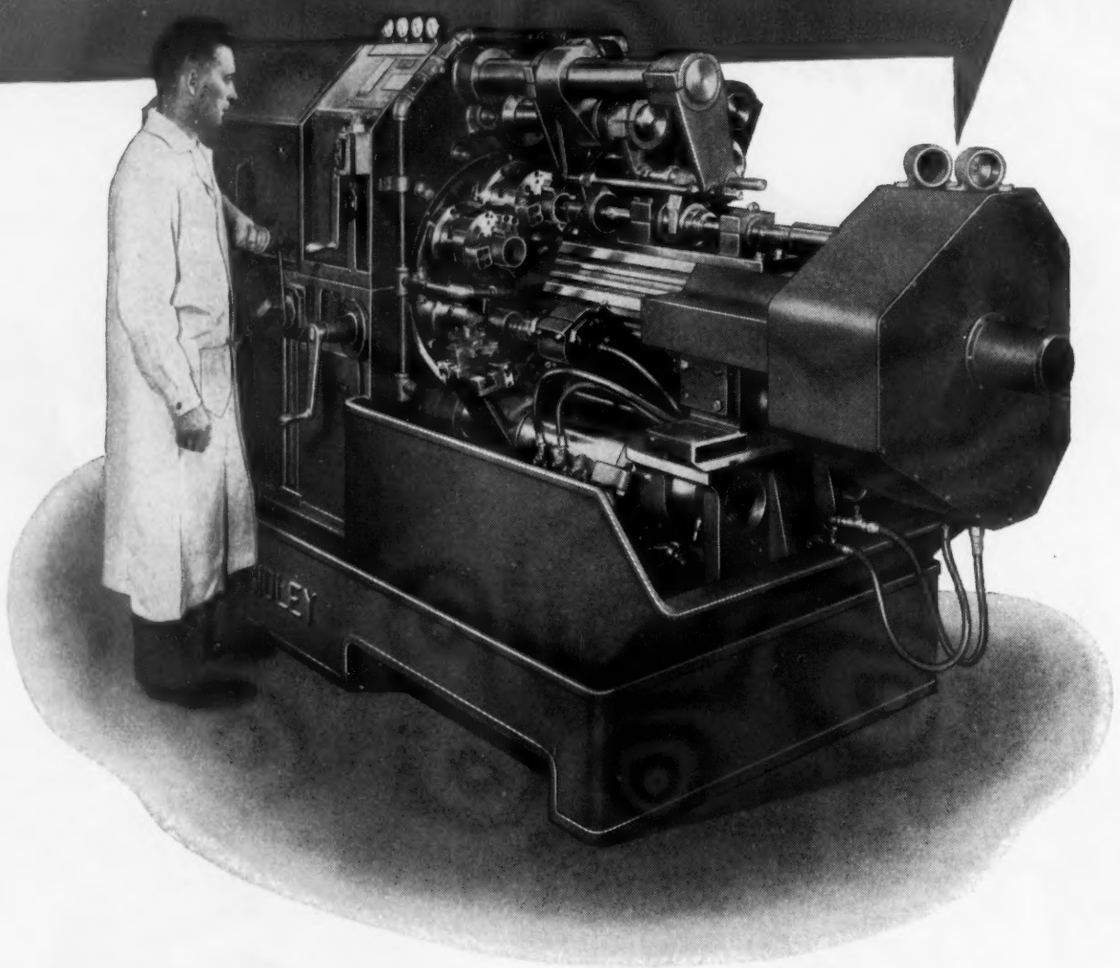
Significance: The creative engineering that goes into solving *special* motor problems, like this one, also points out new ways to build better *standard* motors for you! Watch for these new and better motors from A-C. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

Wait 'til you see the NEW ALLIS-CHALMERS MOTORS!

HEAR THE BOSTON SYMPHONY: *Every Saturday Evening, American Broadcasting Co.*

LEADERSHIP

PROVED BY HUNDREDS OF CASE HISTORIES . . . .



Our "case history" files illustrate the fact that the speed . . . accuracy and versatility of New Britain Multiple Spindle Automatics provide the right combination for countless machining operations. Some are jobs which could not be performed in one operation on any machines except New Britains. Others illustrate high-speed, accurate machining of extremely hard metals requiring deep cuts. Others are perfectly simple pieces . . . remarkable because of the economies made possible by switching from single spindle machines to New Britains.

New Britain engineers stand ready to show you how the profit possibilities of New Britain Automatic Screw and Chucking Machines can be applied to your product . . . Write us about *your* machining problems.

NEW BRITAIN AUTOMATICS

THE NEW BRITAIN MACHINE COMPANY
NEW BRITAIN, CONNECTICUT
NEW BRITAIN-GRIDLEY MACHINE DIVISION

M-01033-A

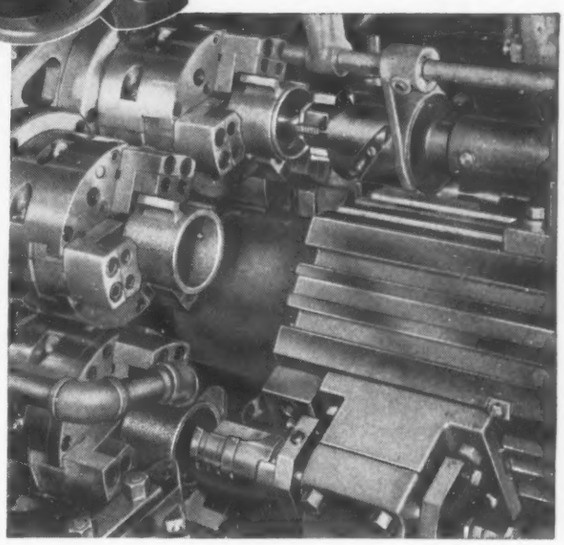
. . . HERE'S ANOTHER

Houdaille Malleable Iron
Shock Absorber Housing

The inside surface of this shock absorber housing must be within a specified tolerance of .002" at all points. This requires not only preservation of accurate diameter, but absolute squareness of the end surface with the cylinder.

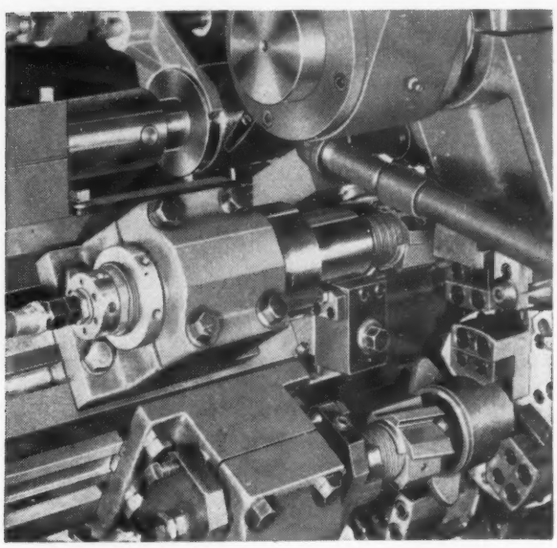
The remarkable feature of the operation is that Houdaille* turns this part out in 29 seconds, from rough casting to finished piece on a battery of New Britain Model 675 Multiple Spindle Automatic Chucking Machines . . . *with no finish grinding required.* The production of 122 pieces per machine per hour, day-in day-out is an ideal instance of how the speed and accuracy of New Britains combine to give you the utmost in production and low cost per piece.

*Pronounced—Hoo-dye



FRONT VIEW

Entirely open end construction provides accessibility for simplified chucking, cutting tool and attachment setup.



★

REAR VIEW

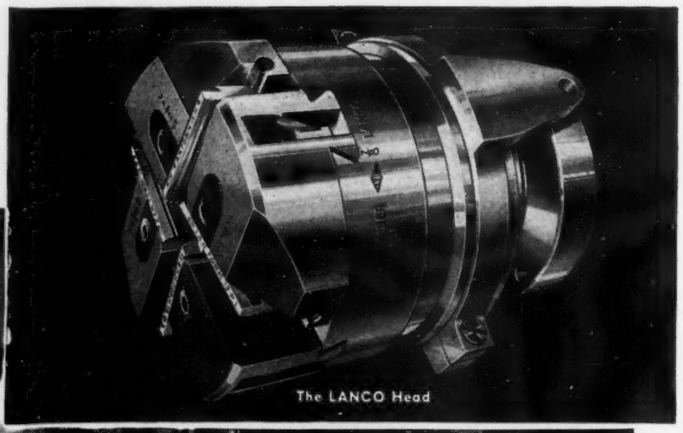
Wide open end construction provides extra large chip space . . . accessibility from three sides and from above that permits excellent visibility and easy tool adjustment.

New Britain builds a complete line of Multiple Spindle Automatic Chucking Machines . . . four, six and eight spindles up to 12" capacity . . . Also a complete line of Multiple Spindle Automatic Screw Machines to 2¼" capacity.

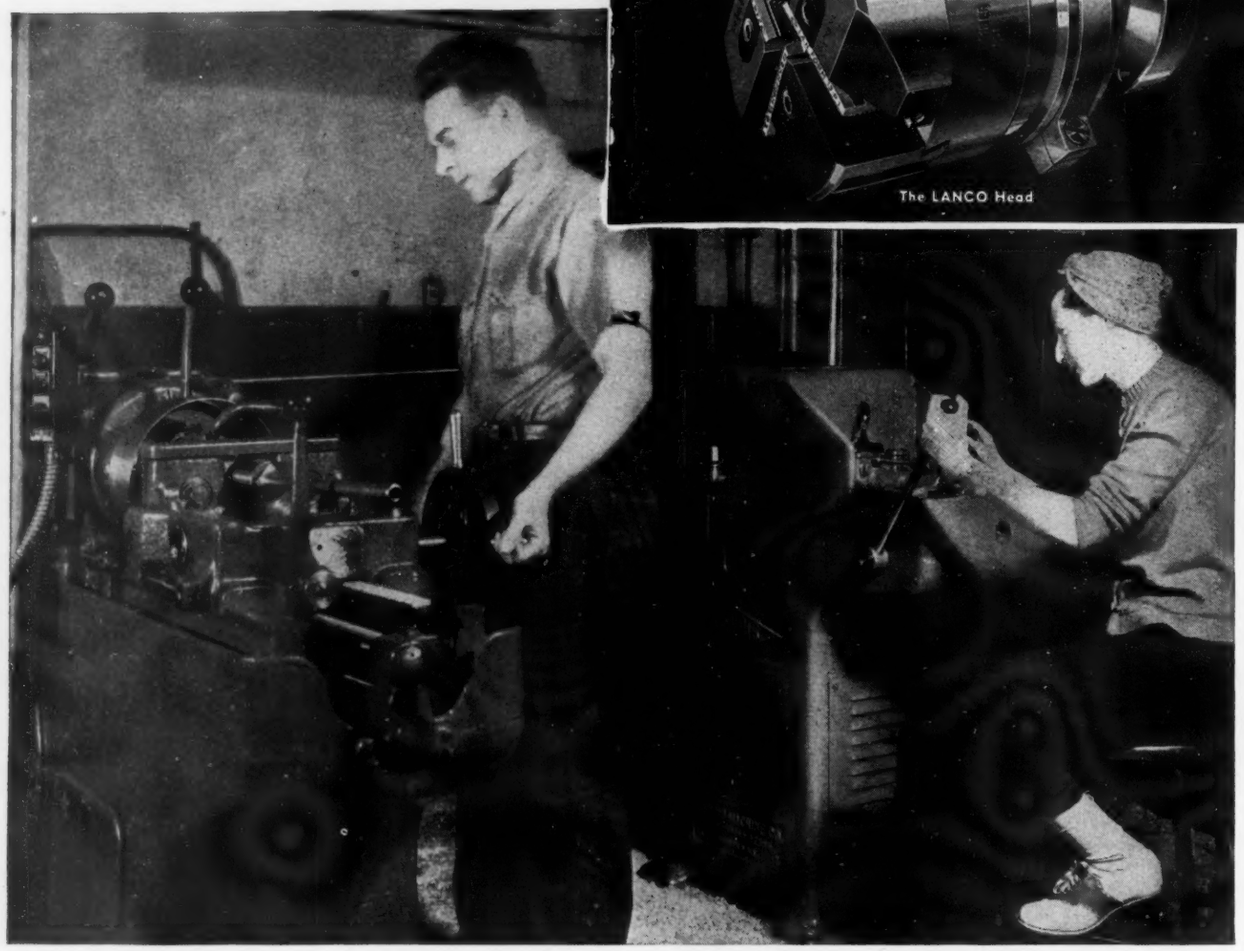
An Ideal Threading Combination

THE LANDMACO
for Large Precision Work

THE 3/8" HIGH SPEED
for Small Parts



The LANCO Head



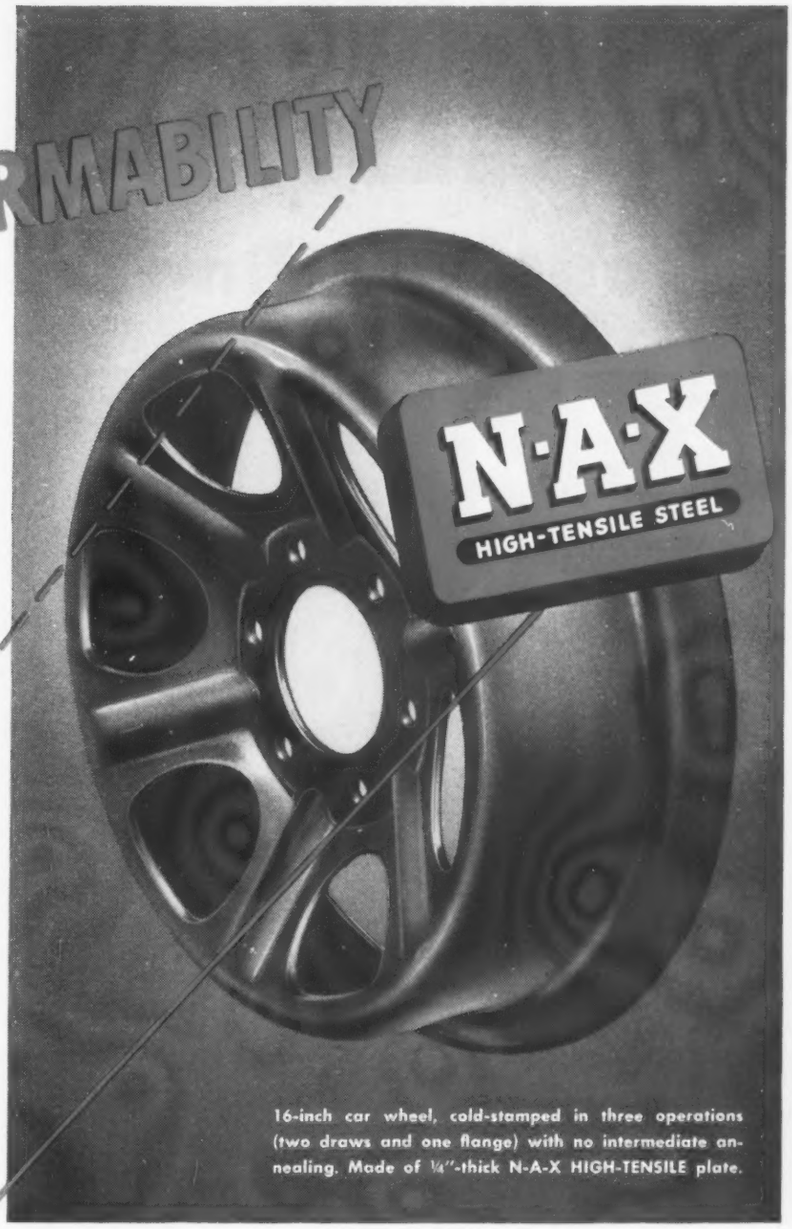
For manufacturers of screw machine products and other small threaded components, the efficiency of this combination is clearly demonstrated by the production records of the machines illustrated. Threading 5/8" diameter 24 pitch threads to class three specifications, the LANDMACO Machine produces 600 pieces per hour. On some smaller threaded parts made from brass the 3/8" High Speed Machine has produced as high as 60,000 pieces per grind of the chasers.

Write for Bulletin No. H-91

LANDIS MACHINE COMPANY

WAYNESBORO · PENNA · U·S·A·

EASY FORMABILITY



16-inch car wheel, cold-stamped in three operations (two draws and one flange) with no intermediate annealing. Made of ¼"-thick N-A-X HIGH-TENSILE plate.

N-A-X HIGH-TENSILE STEEL HAS ALL SIX—KEEPS ALL SIX

- HIGH STRENGTH
- EXCELLENT WELDABILITY
- HIGH FATIGUE-RESISTANCE
- GREAT IMPACT TOUGHNESS
- HIGH CORROSION-RESISTANCE

GREAT STEEL FROM GREAT LAKES

. . . WITHOUT LOSS OF OTHER CHARACTERISTICS

Because of an unusual combination of physical properties that are inherent in the steel, N-A-X HIGH-TENSILE will take deep and difficult cold forms *without losing other desirable characteristics.* It retains structural strength, impact toughness, fatigue-resistance, excellent weldability and high corrosion-resistance during and after production processes. It makes possible lighter, stronger, more durable parts and products, and greater economy in manufacturing. For better steel stampings, specify N-A-X HIGH-TENSILE steel.

GREAT LAKES STEEL CORPORATION

N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
UNIT OF NATIONAL STEEL CORPORATION

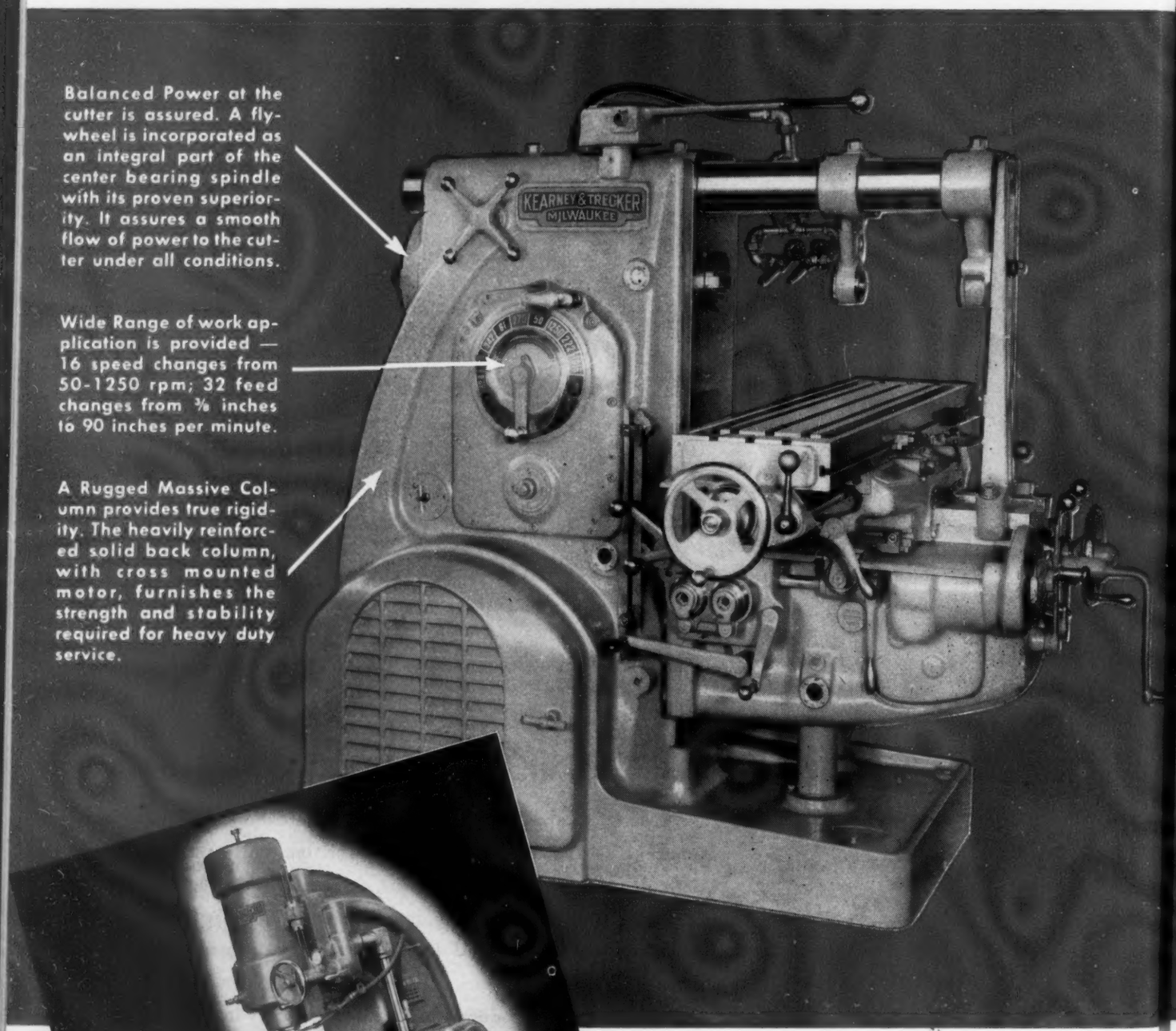
ANNOUNCING

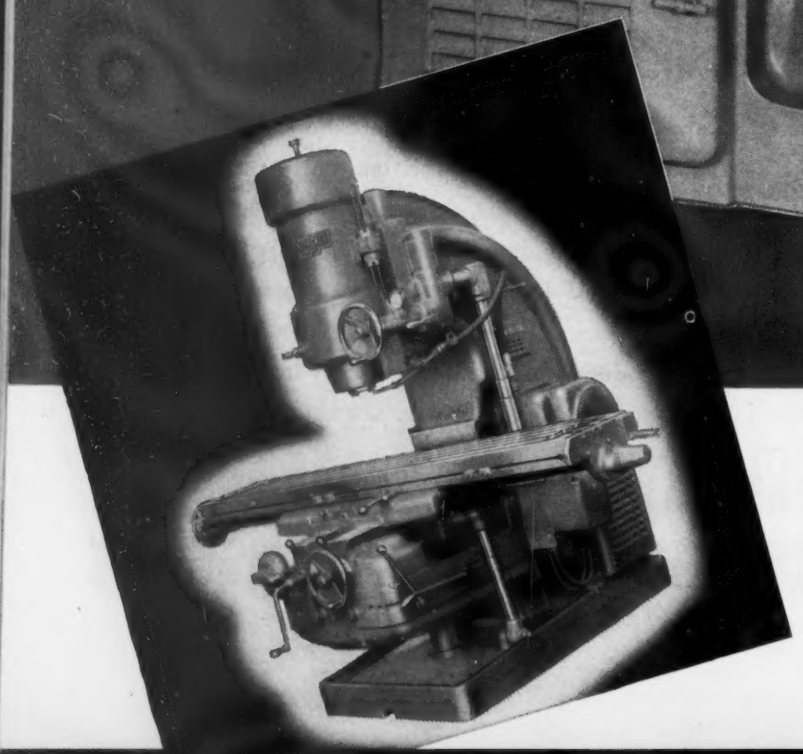
An outstanding addition to the

Balanced Power at the cutter is assured. A flywheel is incorporated as an integral part of the center bearing spindle with its proven superiority. It assures a smooth flow of power to the cutter under all conditions.

Wide Range of work application is provided — 16 speed changes from 50-1250 rpm; 32 feed changes from ⅜ inches to 90 inches per minute.

A Rugged Massive Column provides true rigidity. The heavily reinforced solid back column, with cross mounted motor, furnishes the strength and stability required for heavy duty service.





30 HP CSM HORIZONTAL knee-type machine illustrated above shows the modern, compact design, rugged construction and conveniently accessible controls. Rugged and versatile — all models in the CSM series are designed to meet the stringent requirements of the high rate of metal removal possible when using carbide cutters.

50 HP VERTICAL MODEL of the CSM Series shows outstanding efficiency and versatility of Kearney & Trecker design. Note the rugged column, the built-in flywheel, the accessible controls — insuring utmost productivity and accuracy on all jobs.

THE CSM'S . . .

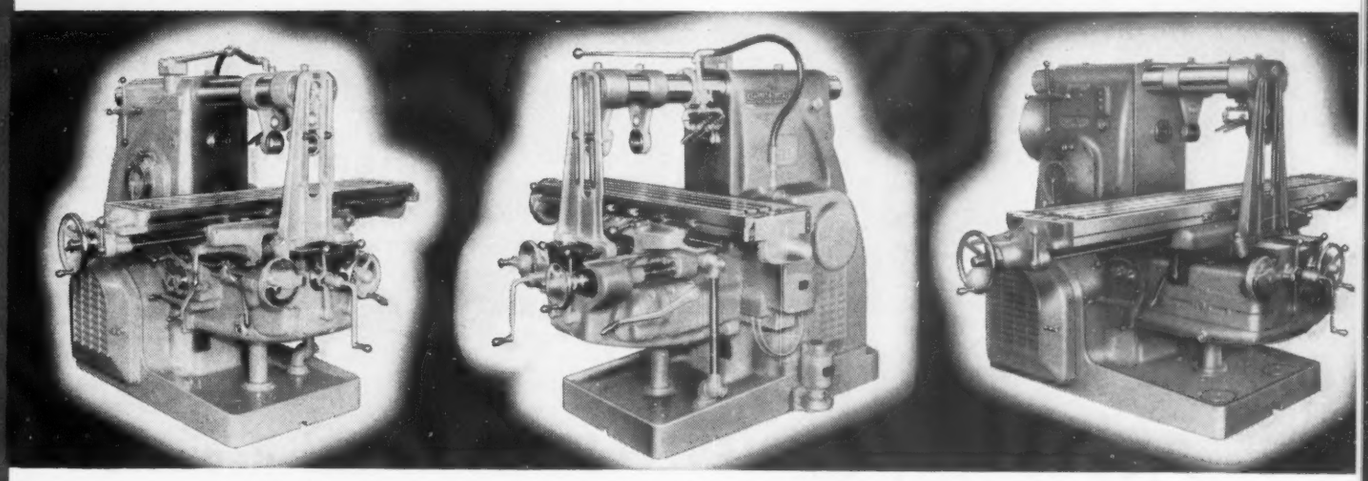
Kearney & Trecker Milwaukee Line

New Series of CSM Knee-Type Milling Machines Now Cuts Production Hours to Minutes Over a Wide Range of Jobs!

A complete series of CSM Machines, high powered for carbide milling of steel — machines that will handle regular milling jobs as well — this is Kearney & Trecker's latest contribution to modern milling equipment.

Pioneered and developed by Kearney & Trecker research engineers, the CSM machines embody the newest and finest in design and engineering features to meet the requirements of modern carbide milling of steel: 1) Solid-back column gives powerful support and rigidity to entire machine; 2) a large, heavy flywheel is an integral part of the spindle, and assures smooth, balanced flow of power to cutter from 20, 30, or 50 hp motor; 3) Wide range of speeds and feeds are carefully selected to match work requirements.

Time-tested operating and performance features of the famous Kearney & Trecker "K" Machines have also been included to give you the finest in up-to-date milling machine construction and operation. CSM Machines are available in both horizontal and vertical knee-type models. For complete information, write for descriptive catalog.



A complete series of power rated machines, in horizontal and vertical models, to meet your requirements.

20 CSM Horizontal—a 20 hp machine with 28″ or 34″ table travel.

30 CSM Horizontal—a 30 hp machine with 34″ or 42″ table travel.

50 CSM Horizontal—a 50 hp machine with 42″ or 52″ table travel.

Write today for Complete Information on these New Machines

KEARNEY & TRECKER CORPORATION

MILWAUKEE 14, WISCONSIN

where EVERY MINUTE COUNTS . . .

. . . you can rely on CLEVELAND Drills and Reamers

The CLEVELAND TWIST DRILL COMPANY
1242 EAST 49TH STREET
CLEVELAND 14

TRADE MARK REG. U. S. PAT. OFF. AND FOREIGN COUNTRIES

ST. THOMAS ST., NEW YORK 7 • 9 NORTH JEFFERSON ST., CHICAGO 6 • 659 HOWARD ST., SAN FRANCISCO 5
2929 EAST GRAND BLVD., DETROIT 2 • 1902 NORTH FIELD ST., DALLAS 1
E. P. BARRUS, LTD., LONDON W. 3, ENGLAND

Advertisement APRIL, 1946

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by Bridgeport Brass Co. "Bridgeport" BRASS CO. *Headquarters for BRASS, BRONZE and COPPER*

Copper-Base Spring Alloys

Dependable, Corrosion and Fatigue-Resistant

Selection of the proper spring material is a most important factor in the manufacture of thousands of electrical and mechanical devices whose operation is dependent upon spring action. Here reliability is most essential and the quality of the vital spring part must be beyond reproach. Certain relays, for example, have minimum operating requirements of at least a million cycles, and the contact arms must continue to retain their dependable spring action. Other electrical applications such as the common electric light snap switch require spring parts capable of severe flexing many thousands of times without failure. Conditions of operation are often far from ideal. There are cases where equipment requires that springs continue to function properly despite temperature extremes, excessive vibration and very corrosive conditions.

ALLOYS SUITABLE FOR SPRINGS

		Phosphor Bronze Grade C	Phosphor Bronze Grade A	Nickel Silver 18% (B)	Duronze II	Tin. Brass	70-30 Brass
ANALYSIS							
Copper	%	91.9	94.35	55.0	97.0	89.0	70.0
Silicon	%				3.0		
Tin	%	8.0	5.5			2.0	
Zinc	%			27.0		10.0	30.0
Phosphorus	%	0.1	0.15				
Nickel	%			18.0			
MECHANICAL PROPERTIES							
Ten. Strength, psi Spring		112,000	103,000	115,000	110,000	85,000	95,000
Elongation % in 2" Spring		3	4	2.5	4	3	3
Rockwell Hardness Spring		B100	B93	B99	B95	B86	B91
PHYSICAL CONSTANTS							
Melting Pt. (Liq)°F		1880	1920	1930	1880	1886	1750
Density, lbs./cu. in.		.318	.320	.314	.308	.317	308
Coeff. Therm. Exp. per °F from 77°F to 572°F x10-6		10.1	9.9	9.3	9.3	10.4	11.1
Thermal Conduct. Btu/sq ft/ft/hr/°F @ 68°F		36	47	17	21	81	70
Elec. Cond. % IACS @ 68°F Soft		13	18	5.5	7	30	28
Mod. of Elas. (Tension) psi.		16,000,000	16,000,000	18,000,000	15,000,000	16,000,000	16,000,000
FABRICATION PROPERTIES							
Machinability Rating**		20	20	30	30	30	30
Cold Working		G	E	G	E	E	E
Hot Working		P	P	P	E	F	F
Hot Working Range °F		....	....	....	1350-1550	1350-1550	1350-1550
SPECIFICATIONS							
A.S.T.M.		B103-Grade C	B103-Grade A	B122 Alloy 4	B97 Type A&C		B36 Alloy 6
Federal			QQ-B-746				
Navy			46B14e				
Army							
AMS			4510A				

** Machinability rating—free cutting brass=100.
E—Excellent G—Good F—Fair P—Poor
All figures are nominal values and should not be used as specifications.

The cost of using the highest quality spring material in electrical appliances, switches, signal systems, temperature and pressure controls, fastening devices and other applications is infinitesimal when compared to the total cost of equipment and the risk of preventable failure.

Designers, engineers, and manufacturers who wish to modernize their metal specifications realize the importance of investigating new alloys and keeping up-to-date on improvements which have been made in those already in existence.

Presented here is a fairly wide range of the most commonly used copper-base spring alloys, together with their physical, mechanical and fabrication properties as well as specifications. Consult Bridgeport's Technical Service Department for assistance in the selection of the spring metal most suitable for the application involved. When used for flat springs, metal finished at tempers ranging from 6 to 8 B&S numbers hard ("extra hard" to "spring" temper) is generally hard enough for this purpose. Where extra rigidity is essential the metal can be made stiffer by ribbing or by increasing its cross-sectional area.

Phosphor Bronze—Grade A (approximately 95% copper, 5% tin, Grade C approximately 92% copper, 8% tin). Excellent spring properties retained under repeated flexing. High fatigue limit and excellent resistance to wear and corrosion. Withstands arcing better than brass. Both alloys have similar properties except that Grade C is used for more severe applications. Used for electrical snap switches, diaphragms, current collectors, spring contacts, and parts for radios and electrical instruments.

Nickel Silver—18% Grade B (approximately 55% copper, 18% nickel, remainder zinc). Silver white color, corrosion resistant. Possesses good spring properties and high electrical resistance. Used for spring parts and contacts for telephone boards, radios, electrical controls, jewelry findings, optical goods, surgical and dental instruments, diaphragms.

Duronze II Spring Metal (approximately 97% copper, 3% silicon). It is stronger, tougher, stiffer and more wear-resisting than brass and is used for items such as electrical springs, contacts, and parts exposed to weathering.

Tin Brass (Jewelers' Bronze) (approximately 89% copper, 1.9% tin, remainder zinc). Has fair spring properties and is used as a substitute for Phosphor Bronze spring metal.

Spring Brass (approximately 69.5% copper, remainder zinc). Stiff and springy, used for making light-duty flat springs. Not recommended for outdoor use or for conditions requiring repeated flexing.

COPPER ALLOY BULLETIN

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, research chemist of the Bridgeport Brass Company.

LOCALIZED STRESSES MAY INCREASE STRESS CORROSION

Frequently, stress corrosion cracks develop only around sheared, drilled and threaded holes, in which rivets, bolts or screws may be fastened, because the holes operate to increase locally the intensity of the stresses.

Fig. 1

When the tensile stresses applied at the opposite ends of a plate, containing one or more circular holes, are within the proportional limit, the stress is localized at the ends of the axis of the hole which is at right angles to the applied stress (see Fig. 1, location h). This localized stress may be several times greater than the average stress found in other parts of the plate.

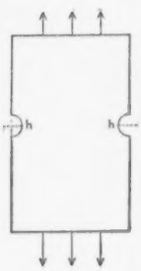


Fig. 2

Small semi-circular notches on the sides of a plate behave in the same manner as small circular holes, as far as localized stresses are concerned (see Fig. 2).

If the hole is elliptical in shape, the stress is most highly localized at the ends of the horizontal axis of the hole and is equal to approximately $(1 + 2\frac{a}{b})$ times the applied stress (see Fig. 3); where "a" is equal to $\frac{1}{2}$ the horizontal axis of the hole and "b" is equal to $\frac{1}{2}$ the vertical axis.

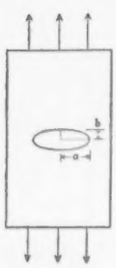


Fig. 3

The ratio $\frac{a}{b}$ indicates that a very flat elliptical hole at right angles to the direction of the tensile stress produces a very high stress at the ends of the hole. This explains why narrow slots and cracks at right angles to the direction of the applied force tend to weaken structural or fabricated parts far more than one would expect on the basis of the reduction in cross-sectional area alone.

When the stresses are beyond the proportional limit, the intensity of the localized stress appears to depend primarily upon the ductility of the metal. That is, a ductile metal such as copper and certain copper alloys can be stretched considerably beyond the yield point without producing a great increase in stress. The stress distribution beyond the yield point tends to become more and more uniform as the metal stretches.

Minimizing the Possibilities of Stress Concentration

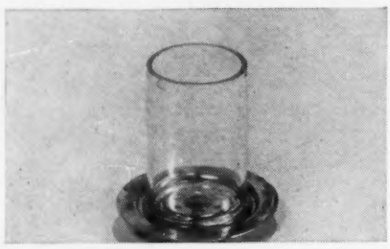
The above discussion suggests that the following procedures should help to keep the effect of stress raisers down to a minimum:

1. Increase the cross-sectional area.
2. Decrease the load.
3. Consider fastening pieces together by welding to avoid the effect of holes.
4. Fill space between hole and rivet, bolt or screw with solder or brazing alloy.
5. Orient elliptical holes so that the short axis is at right angles to the direction of the applied stress.
6. Use a ductile, stress corrosion-resistant metal if permissible.

OXYGEN-FREE COPPER FOR VACUUM TUBE PARTS

Oxygen-Free Copper, with its high electrical conductivity, finds wide use in radar, electronics and other exacting electrical applications.

The illustration shows a part for a high-frequency vacuum tube manufactured by the Sylvania Electric Products Company. A special sealing process is used to bond the glass to the copper. The unit is placed in a high-frequency magnetic field, which brings the copper to a red heat. This melts the portion of the glass in contact with the copper, and a perfect metal-to-glass seal is obtained.



Glass is sealed to Oxygen-Free Copper in this part for a high-frequency vacuum tube, manufactured by Sylvania Electric Products Company.

Freedom of the metal surface from scratches and flaws is highly important in obtaining a perfect seal, which is necessary in order to draw a vacuum. The Sylvania Electric Products Company found Bridgeport Oxygen-Free Copper superior for this application.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

A Baking White Enamel which is said to be suitable for any product requiring gleaming whiteness, can be sprayed on bare clean metal. It bakes quickly to a hard glossy finish which is resistant to abrasives, acids, alkalies, salt spray, humidity, water immersion and the softening action of fats and oils. **No. 673**

Portable Brazing Sets that only require connection to a 220-volt power source to make them ready, are said to be especially adapted for use wherever it is desirable to take the brazing equipment to the job. Three sizes available weigh 30, 100 and 250 pounds with corresponding secondary currents of 625, 833 and 1667 amperes. **No. 674**

A New Computing Device is claimed to have the accuracy which would be afforded by a slide rule 36½ feet long. It handles both ordinary multipliers and divisors, as well as square root quantities. Employing the use of logarithmic scales, the device uses only half the number of scales utilized by a slide rule. **No. 675**

A New Support for plates, piping, tubing, etc., when overhung from machine tables, is said to be adjustable for height, with interchangeable roller heads. Roller heads are available in several styles: flat roller, V roller, strip roller and tilted. **No. 676**

A Direct-reading Instrument is stated to allow the quantitative chemical analysis of as many as eleven elements in metal alloys, chemicals and other materials. Quantitative spectro-analysis is claimed to be the specific purpose of the instrument, and the results appear directly as percentage composition on a series of counters, one for each element being determined. **No. 677**

A Silent Stock Tube designed for use on both single and multiple spindle automatic screw machines is claimed to eliminate noise caused by revolving bar stock. In construction it consists of a helically wound, wear resistant steel liner, covered by sound absorbent material, encased in a steel tube to form a compact, rigid stock tube. **No. 678**

A Compact Water Testing Kit makes possible testing for hardness and alkalinity for maintaining suitable boiler feed or process water conditions. It is claimed that all normal water control tests except those for dissolved oxygen can be performed from this single, portable unit. **No. 679**

A Non-clogging Strainer for coolants and cutting oils is reported to provide cleaner fluids and longer periods of uninterrupted strainer service. Constructed of knitted fabric and wire, made into non-collapsible rectangular units with high straining area, it catches dirt, grit and chips effectively while providing ample free area for the passage of cleaned fluids. **No. 680**

BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL

Warehouse Service in Principal Cities

STRIP AND SHEET—For drawing, stamping, forming, spinning. Leaded alloys for machining, drilling, tapping. Silicon bronze, phosphor bronze for corrosion resistance. Alloys suitable for springs. Engravers' copper and brass.

WIRE—Cold Heading alloys for screws, bolts, nuts, nails, fastenings, electrical connectors, Phono-Electric trolley and contact wires.

ROD—Alloys for screw machine operation. Duronze III high strength, corrosion-resistant, good for machining and hot forging. Hot forging and cold heading alloys. Welding Rods. Copper-covered ground rod.

TUBING—For miscellaneous fabrication. For condensers and heat exchangers. For water, air, oil and hydraulic lines.

DUPLEX TUBING—for conditions too severe for a single metal or alloy.

PIPE—Brass and copper for plumbing.

FABRICATED GOODS—Plumbing brass goods. Radiator air valves. Aer-a-sol insecticide dispensers. Automobile tire valves.

TECHNICAL SERVICE—Staff of experienced, laboratory-trained men available to help customers with their metal problems.

WAREHOUSE SERVICE—Warehouse and jobbers stocks available for prompt delivery in principal cities.

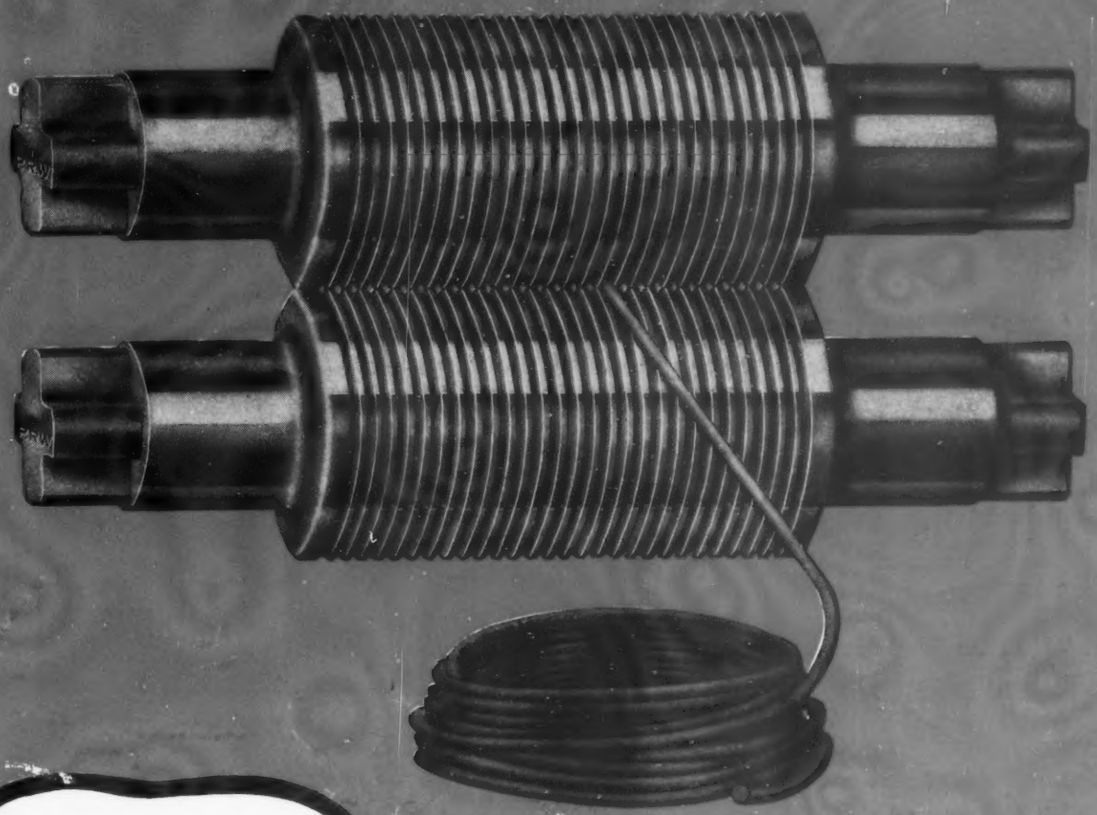
TECHNICAL LITERATURE — Manuals and handbooks available for most products.

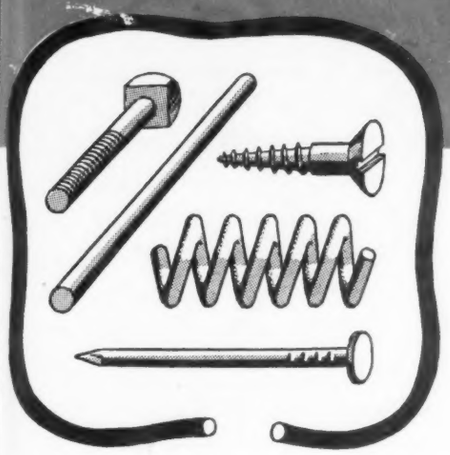
"Bridgeport" BRASS

BRIDGEPORT BRASS

BRIDGEPORT BRASS COMPANY, BRIDGEPORT 2, CONN. • ESTABLISHED 1865

ROLLING TECHNIQUE . . .





Rods

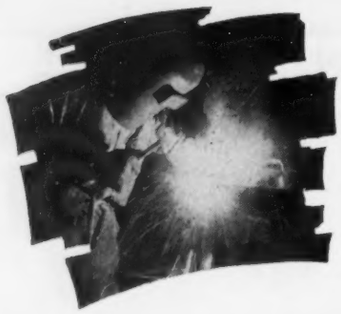
Rod mills, with their ever increasing delivery speeds, require better and better rolls to stand up and give high tonnages of quality rod. Continuous rod mills now in operation are rolling not only steel and numerous alloys but non-ferrous metals as well.

Pittsburgh Rolls, with over three-quarters of a century of roll-making experience and satisfactory performance behind them, can be relied upon to deliver the production of highest quality for which high speed modern mills are designed, at *less cost per ton of steel rolled.*

PITTSBURGH ROLLS
Division of Blaw-Knox Company
PITTSBURGH, PA.

PITTSBURGH ROLLS 76 YEAR'S EXPERIENCE 1870 1946

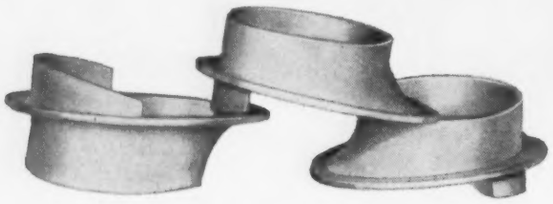
PITTSBURGH ROLLS



Weld this Lebanon Circle Ⓛ Alloy without Loss of Corrosion Resistance...

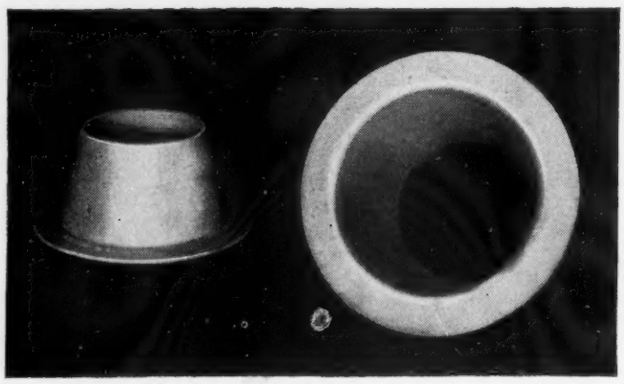
SPECIFY Lebanon Circle Ⓛ 21—and eliminate need for post-welding heat treatment of castings.

In this 18% chrome and 8% nickel steel, the addition of columbium forms a stable columbium carbide constituent that guards against



carbide precipitation and inhibits inter-granular corrosion. As a result, application of heat during the welding process has no effect on the alloy's corrosion-resistant qualities.

That's why Circle Ⓛ 21 is especially suited for weldments—units produced by the welding together of several castings. Many weldments are so large or so intricate in shape that post-welding heat treatment is impossible. But, when Circle Ⓛ 21 is specified, this is no disadvantage—since there is never any need for such heat treatment.



This alloy is a sound choice for structures that must resist corrosion, that must be welded and that do not permit post-welding heat treatment. Lebanon foundry engineers and metallurgists will be glad to furnish details of its varied applications.

LEBANON CIRCLE Ⓛ 21	
Average Physical Properties—Water Quenched	
Tensile Strength, 80,000 lbs.	Elongation 41%
Yield Point . . . 41,000 lbs.	Brinell Hardness 145

Bulletin sent free on request.

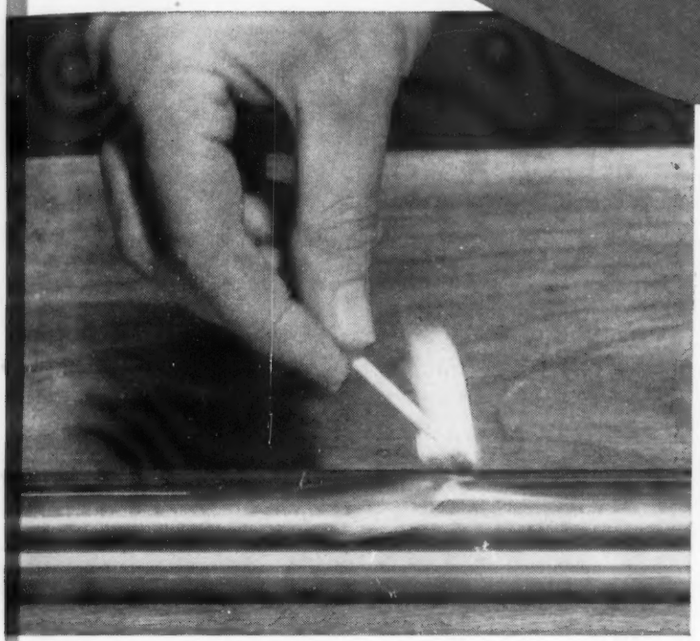
LEBANON STEEL FOUNDRY • LEBANON, PA.

ORIGINAL AMERICAN LICENSEE GEORGE FISCHER (SWISS CHAMOTTE) METHOD

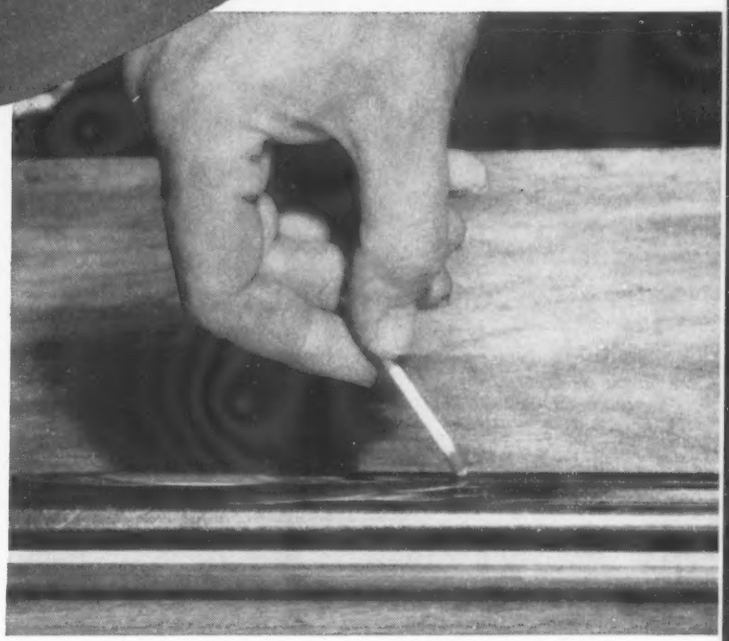
"In the Lebanon Valley"

Lebanon ALLOY AND STEEL Castings

What This Simple Test Shows You About SUPERFINISH



Take a ground shaft (finish ground if you like) and scratch a match on it. The match will light. Why? Because there is enough surface roughness to abrade the sulphur tip—to cause friction and heat. These same ridges can penetrate an oil film and cause friction on bearing surfaces. Surface roughness is 20 micro-inches, R.M.S.



Make the same test on a Superfinished *surface. The match won't ignite. There is nothing to create friction. Here is a degree of smoothness that will support and maintain a uniformly thin oil film—without ridges to penetrate and abrade the mating surface. The life of such a bearing surface is unlimited. Surface Superfinished to 3 micro-inches, R.M.S.*

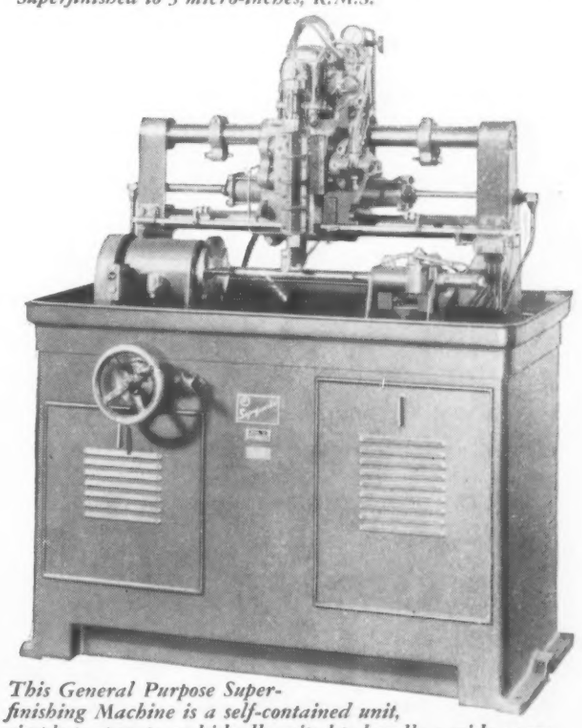
Removing grinder scratches, feed spirals, chatter marks, and partially loosened metal splinters by *Superfinishing* is a very quick and inexpensive operation. These finely finished surfaces are a real economy because they not only reduce friction and wear to a new minimum, but they also eliminate the most common bearing troubles. And surprisingly enough, *Superfinishing* may actually cut your manufacturing costs as well—by eliminating other more expensive processes involved in producing smooth finish.

Gisholt engineers are ready to give you facts about this important development.

GISHOLT MACHINE COMPANY
1217 East Washington Avenue
Madison 3, Wisconsin

GISHOLT

Look Ahead
Keep Ahead
with Gisholt



This General Purpose Superfinishing Machine is a self-contained unit, simple to operate and ideally suited to handle a wide range of miscellaneous or production work. Other sizes and types are available, as well as Superfinishing attachments for lathes.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

here's power for industry

THE NEW DELCO MOTOR

This is not merely an "improved" motor; it is new—designed and built to meet specifications for "the perfect motor" worked out by men who live with machine tools . . . who use and service motors every day in big production plants.

It has *all* the qualities and features that production men specified as most important for solid, on-the-job performance . . . including doubly protected coils and windings—*with coils individually taped;* better cooling; ruggedness and simplicity in construction. It provides much easier maintenance, easy attachment on tools, four-position operation, and better applied power.

Complete information available on request.

Check these

NEW DELCO MOTOR FEATURES

Totally enclosed; fan-cooled.

Individually taped coils.

Thoroughly insulated windings.

Unit-cast ball-bearing rotor, dynamically balanced; parts interchangeable end to end.

Double-shell frame with new simplified cooling system.

Extra-large conduit box, usable in four 90° positions.

Extended, accessible mountings, cast as a unit with main frame.

Sizes to fit standard NEMA machine tool mountings.

DELCO MOTORS

DIVISION OF GENERAL DELCO PRODUCTS DAYTON, OHIO MOTORS CORPORATION

Scovill NON-FERROUS FORGINGS

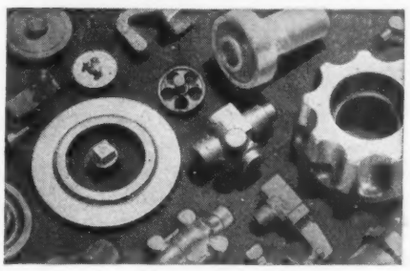
When SCOVILL becomes your METAL PARTner

You Can Cut Costs on Metal Parts like these

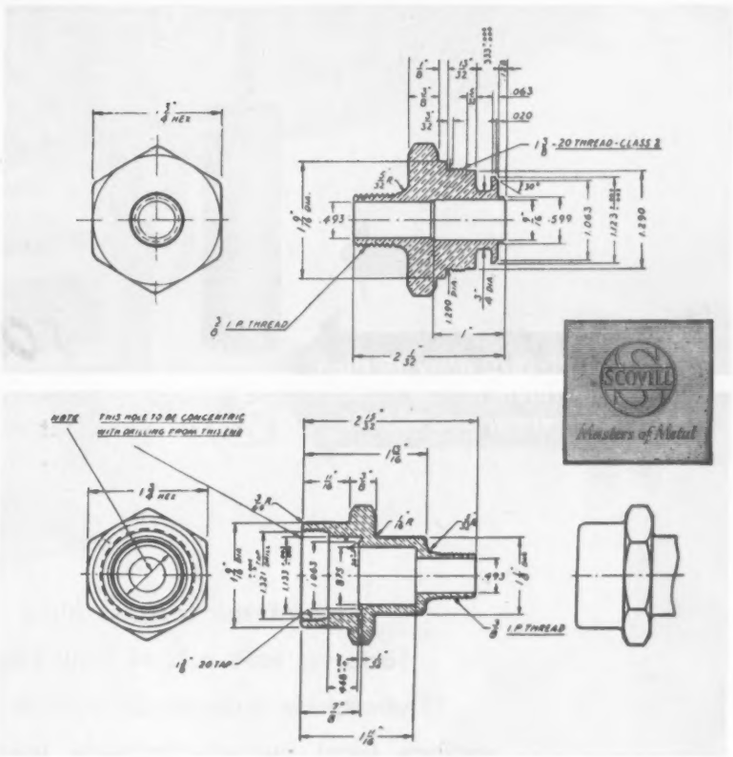
These drawings show the two parts of a special coupling *forged and machined* by Scovill. Both parts were previously turned out on a screw machine from 1¾" hexagonal brass bar stock . . . the male section requiring 2,050 lbs. of rod per thousand pieces . . . the shank section requiring 2,500 lbs. When Scovill did the job by forging, metal requirements of the male section dropped to 884 lbs . . . the shank to 964. *Total savings of brass were 2,702 lbs. per thousand assemblies.*

Although the forging and machining of these pieces involved no particular engineering skill, this case study shows how Scovill's fast metal-working equipment can turn out parts from less metal at lower costs.

If you suspect that your brass, aluminum and other non-ferrous metal parts are costing you too much or can be made better in another design, you're ready to talk things over with Scovill. Scovill's long forging experience has probably licked tougher problems than yours.



INVESTIGATE SCOVILL. All you have to do to discover whether you'll benefit from making us *your* METAL-PART*ner*, is to fill in the coupon below and mail it today. Scovill Manufacturing Company, Waterbury 91, Conn.



Please send me information about your metal-working facilities. I am interested in metal forgings for the applications checked:

- ☐ Aircraft
- ☐ Automobiles
- ☐ Band Instruments
- ☐ Blow Torches
- ☐ Cameras
- ☐ Communication Equipment
- ☐ Compressed Gas Cylinders
- ☐ Fire Extinguishers
- ☐ Household Appliances
- ☐ Industrial Instruments
- ☐ Plumbing Goods
- ☐ Pumps
- ☐ Valves
- ☐ Welding Equipment

Other applications .....

.....

SCOVILL MANUFACTURING COMPANY
Forgings Division
20 Mill Street
Waterbury 91, Connecticut

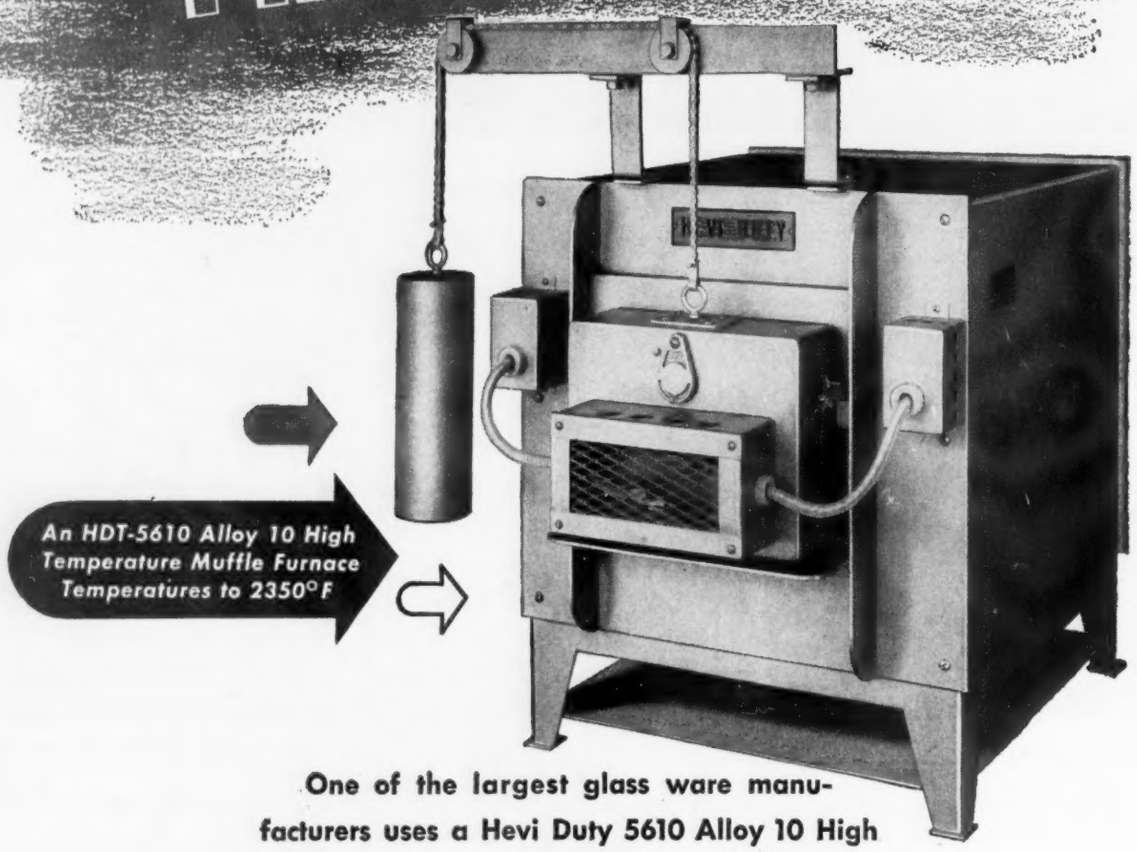
Name .....

Company .....

Address .....

To Improve Analysis

PRECISION



One of the largest glass ware manufacturers uses a Hevi Duty 5610 Alloy 10 High Temperature Furnace in routine control analysis to replace blast burners formerly used for igniting precipitates. It improves the precision of the analysis by eliminating the possibility of mechanical loss from the burners and provides a higher, more uniform temperature than obtainable under the old method. Other uses and details of this furnace are in Bulletin HD-339 — send for your copy.

HEVI DUTY ELECTRIC COMPANY

LABORATORY FURNACES **MULTIPLE UNIT** ELECTRIC EXCLUSIVELY

TRADE MARK
REG. U. S. PAT. OFF.

MILWAUKEE, WISCONSIN

A difficult tubing problem—

Inside Diameter .9995 to 1.0005"
Outside Diameter 1.120"
Wall Thickness .059 to .060"
Length 9¼" (+1/32 —.00")
A Mirror-like Inside Finish

The answer to the problem—

Republic ELECTRUNITE TUBING

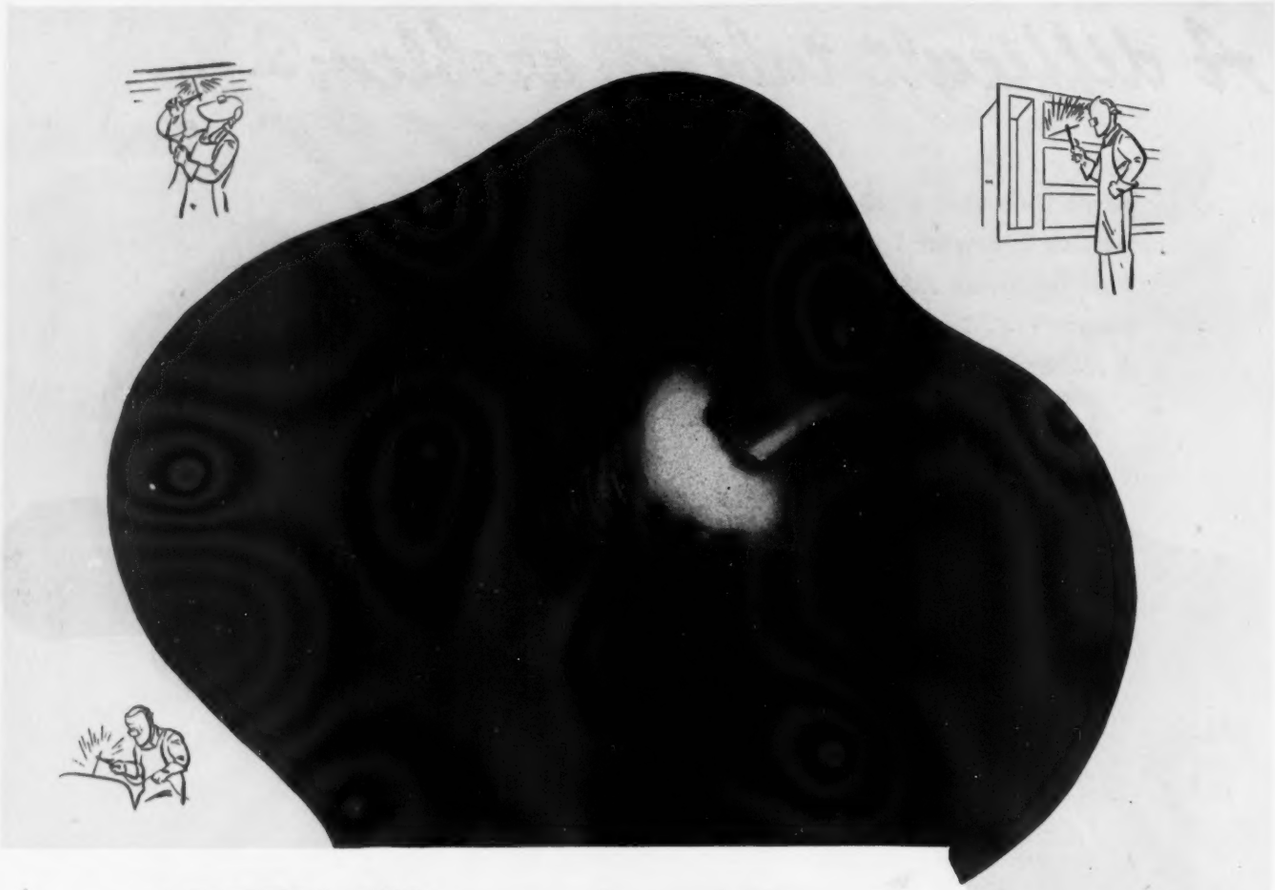
ELECTRUNITE's ability to meet the most difficult requirements is evidenced by the fact that many thousands of these automotive shock absorber parts have been used by one of the nation's most exacting manufacturers.

While these requirements are unusually rigid, they demonstrate the inherent characteristics of ELECTRUNITE tubing — consistent uniformity of wall thickness, diameter and concentricity on a production basis.

You will find ELECTRUNITE engineers ready to give you complete wholehearted cooperation in improving product design or efficiency.

REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION • CLEVELAND 8, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Mechanical, Aircraft, Stainless Steel and Rail Steel Tubing — Boiler, Condenser and Heat Exchanger Tubes



SPEED UP out-of-position welds with 3/16"...

P&H

"AP"

CLASS AWS-ASTM-E6010

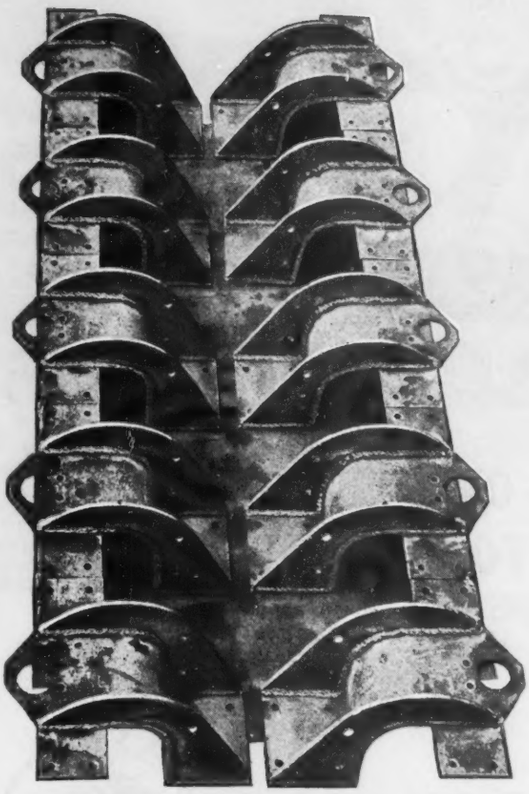
Because of its remarkable versatility, you can use AP size 3/16" in place of 5/32" on all types of joints—in all positions.

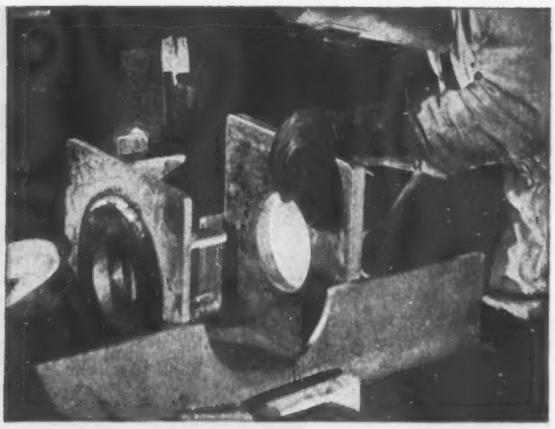
AP is easier to handle . . . it has a fine SPRAY-TYPE ARC. Its DEEP PENETRATION qualities assure strong, lasting bonds and produce X-RAY PERFECT welds. Its unusually LOW SPATTER LOSS means extra footage, increased production. Its exceptionally THIN, EASILY REMOVED SLAG greatly reduces cleaning time. AP gives you all these cost-lowering advantages.

AP also produces good tie-ins and fast, spot penetration without "humps" — it's a PERFECT TACKING ELECTRODE.

If you want lower costs on out-of-position welds, use AP.

Write for Data Sheet Giving Physical Properties, Applications and Procedures





FOR TACK WELDING — in any position—3/16" AP gives perfect results; quick, deep penetration, eliminating humps.

FOR INDUSTRIAL FABRICATION — in volume production, 3/16" AP provides fast downhand deposition and enables the operator to switch to vertical and overhead work without stopping to change electrodes.

FOR PIPE WELDING — here again, 3/16" AP is a big money-saver for butt welding and joining all types of fittings with its smooth-flowing, deep penetrating arc.

CALL YOUR P&H REPRESENTATIVE

P&H makes a production-proved electrode for *every* welding requirement: for all mild, alloy and stainless steel applications, cast iron and for building up and hard surfacing.

ON CONSTRUCTION WORK— 3/16" AP ends the need for frequent time-wasting changes to smaller electrodes when working from downhand to out-of-position welds.

P&H WELDING ELECTRODES

4411 West National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

WELDING ELECTRODES • MOTORS • HOISTS P&H ELECTRIC CRANES • ARC WELDERS • EXCAVATORS

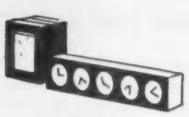
AMERICA'S MOST COMPLETE ARC WELDING SERVICE

DC Welders

AC Welders

Welding Electrodes

Welding Positioners

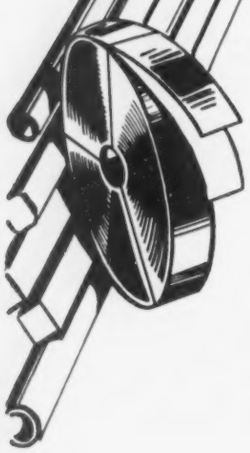


Welding Production Control Systems

Electric Hoists

HOW TO GET BRASS MILL PRODUCTS!

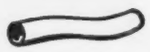
BRASS, BRONZE AND COPPER... Rod, Bar, Sheet, Strip, pipe, tubing, and wire in Production Quantities.



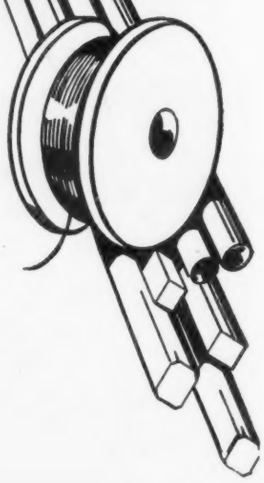
GOVERNMENT-OWNED SURPLUS STOCK

in many standard and non-standard grades, finishes, sizes and specifications AVAILABLE NOW in production quantities

—and new surplus declarations are being made daily.



EASY TO FABRICATE... This stock may be fabricated by normal production methods.



HOW TO PURCHASE

1. Estimate, for any convenient period, your production needs in each specification, finish, gauge, etc.
2. Write, wire or phone that information to your nearest War Assets Corporation office* below. We will advise you of the location and condition of the stock you need, estimate possible delivery dates, quote prices and help arrange credit.
3. When satisfactory arrangements have been made, we will start shipments.

***WAR ASSETS CORPORATION** is a Reconstruction Finance Corporation subsidiary. When checking telephone and other directories, simply look up RFC.

VETERANS OF WORLD WAR II: To help you in purchasing surplus property from War Assets Corporation, a veterans' unit has been established in each of our Regional Offices listed below.

A DISPOSAL AGENCY DESIGNATED BY THE SURPLUS PROPERTY ADMINISTRATION for Surplus Producers' and Capital Goods, Aircraft and Plants formerly handled by Reconstruction Finance Corporation . . . and for Surplus Consumer Goods formerly handled by United States Department of Commerce.

WAR ASSETS CORPORATION

(A SUBSIDIARY OF RECONSTRUCTION FINANCE CORPORATION)

RFC OFFICES (INCLUDING FORMER DEPARTMENT OF COMMERCE REGIONAL SURPLUS PROPERTY OFFICES) LOCATED AT: Atlanta • Boston • Chicago • Denver • Kansas City, Mo. • New York • Philadelphia • San Francisco • Seattle • OTHER RFC SURPLUS PROPERTY OFFICES LOCATED AT: Birmingham • Charlotte • Cleveland • Dallas • Detroit • Helena • Houston • Jacksonville • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • Oklahoma City • Omaha • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • Spokane • OTHER FORMER DEPARTMENT OF COMMERCE REGIONAL SURPLUS PROPERTY OFFICES LOCATED AT: Cincinnati and Fort Worth

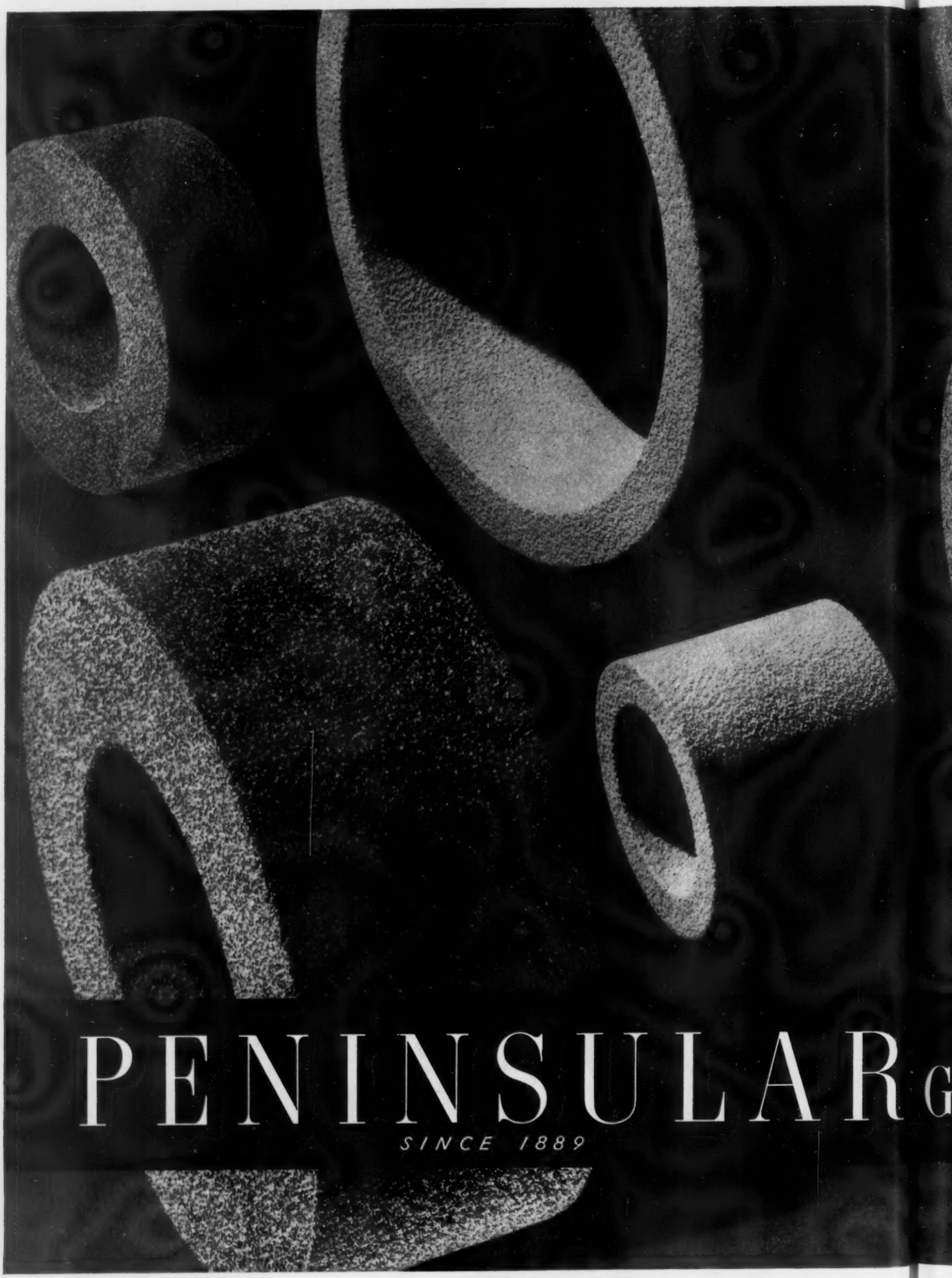
157-4

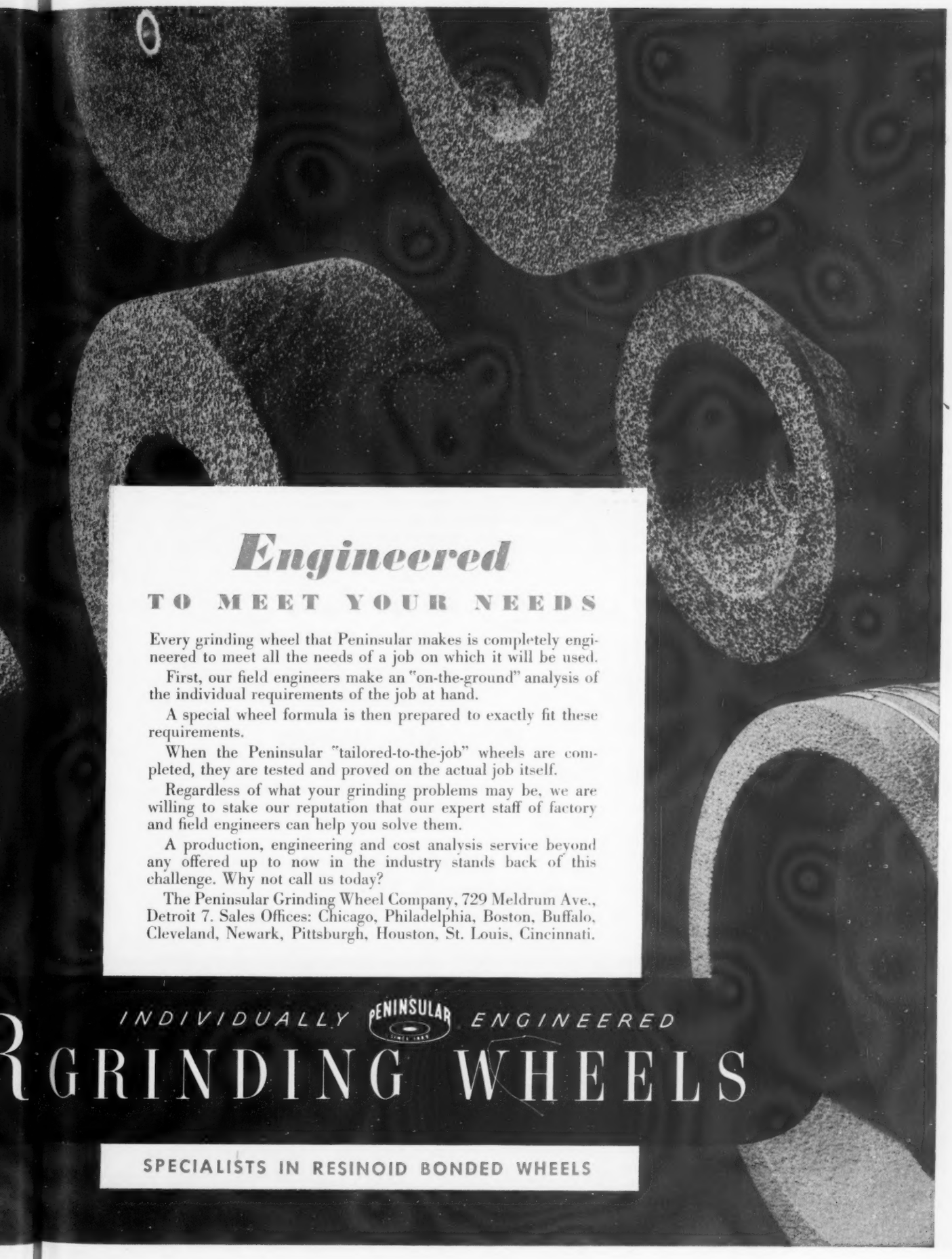
Just Darn Good Blocks

Heppenstall Die Blocks are naturally expected to give, *and do give,* a substantial margin of extra service. Heppenstall Co., Pittsburgh, Pa.

Heppenstall

the most dependable name in die blocks


PENINSULAR G
SINCE 1889



Engineered

TO MEET YOUR NEEDS

Every grinding wheel that Peninsular makes is completely engineered to meet all the needs of a job on which it will be used.

First, our field engineers make an "on-the-ground" analysis of the individual requirements of the job at hand.

A special wheel formula is then prepared to exactly fit these requirements.

When the Peninsular "tailored-to-the-job" wheels are completed, they are tested and proved on the actual job itself.

Regardless of what your grinding problems may be, we are willing to stake our reputation that our expert staff of factory and field engineers can help you solve them.

A production, engineering and cost analysis service beyond any offered up to now in the industry stands back of this challenge. Why not call us today?

The Peninsular Grinding Wheel Company, 729 Meldrum Ave., Detroit 7. Sales Offices: Chicago, Philadelphia, Boston, Buffalo, Cleveland, Newark, Pittsburgh, Houston, St. Louis, Cincinnati.

INDIVIDUALLY PENINSULAR *ENGINEERED*

R GRINDING WHEELS

SPECIALISTS IN RESINOID BONDED WHEELS

HERE...*better protection for magnesium parts*

H-VW-M MANODYZ PROCESS*

In speed, in cost, in its ability to impart wear- and corrosion-resistance to magnesium alloys, the Manodyz Process is in stride with the vast recent improvements in the alloys themselves. The Manodyz Process produces a protective and decorative magnesium-oxide-silicate film on magnesium alloys *electrolytically*—a finish that is highly corrosion-resistant and an excellent paint base.

Fast...Uses A-C or D-C Current

Either a-c or d-c current is used with the Manodyz Process. Having different characteristics with each type of current, the Manodyz Process becomes extremely versatile where both a-c and d-c are available. With either current, parts are completely processed, under normal conditions, in thirty minutes.

Attractive Natural Color...Takes Dyes

Manodyz finishes have attractive *natural* color . . . and—unlike dichromate and other finishes—they can be *dyed* to practically any *other* color desired. The natural color of a-c Manodyz coating is a light-to-dark gray. The d-c Manodyz Process produces, on most alloys, an attractive pale-to-dark green.

100 Times More Resistant to Abrasion

Manodyz finishes are much harder than the magnesium alloys themselves. Tested on Taber abrasion machines, Manodyz finishes withstood over *100 times* as many revolutions of a CS17F wheel, without break-through, than did non-electrolytic finishes applied to magnesium alloys for the same purposes.

Manodyz Coatings Are Tough

The a-c Manodyz Process is well suited to use with narrow-gauge skins used in aircraft manufacture. Using bend radii recommended for room-temperature forming, a-c Manodyz finished parts have been bent 90° and back without failure of outside surface.

High Impact-Resistance

In tests, no failure of finishes was detected in examining with a 5-power reading glass the concavity produced in Manodyzed surfaces by the full force of a rounded-head hammer against a solid backing.

High Dielectric Strength

A film thickness of .0002 inch applied by either the a-c or d-c Manodyz Process will hold back the electrical potential of a 110 volt domestic circuit.

A PROVED, EFFICIENT METHOD. Write to Hanson-Van Winkle-Munning Company, Matawan, N. J., for full details.

*Patents Pending

663

HANSON-VAN WINKLE-MUNNING CO.

MATAWAN, NEW JERSEY

Manufacturers of a complete line of electroplating and polishing equipment and supplies

Plants: Matawan, New Jersey · Anderson, Indiana

Sales Offices: Anderson · Chicago · Cleveland · Dayton · Detroit · Elkhart
Matawan · Milwaukee · New Haven · New York · Philadelphia
Pittsburgh · Rochester · Springfield (Mass.) · Syracuse

They CALLED BRANDT FOR PRECISION METAL WORK

For STAMPINGS of

EXTREME RANGES IN SIZES AND METALS

for HOME APPLIANCES

The production of electric iron housings is a typical example of Brandt's facilities to produce smaller stampings. These stampings are of aluminum, weigh less than ¼ lb., and meet close precision specifications. They were produced on a mass production schedule, on a rush delivery basis.

for AIRCRAFT

This large aluminum alloy stamping is part of a fuel tank Brandt completely fabricated for a leading Aircraft Manufacturer. This bulky stamping (4'-2" x 3'-5" with 5" draw) was pressed out in one operation on the huge hydraulic press, here shown.

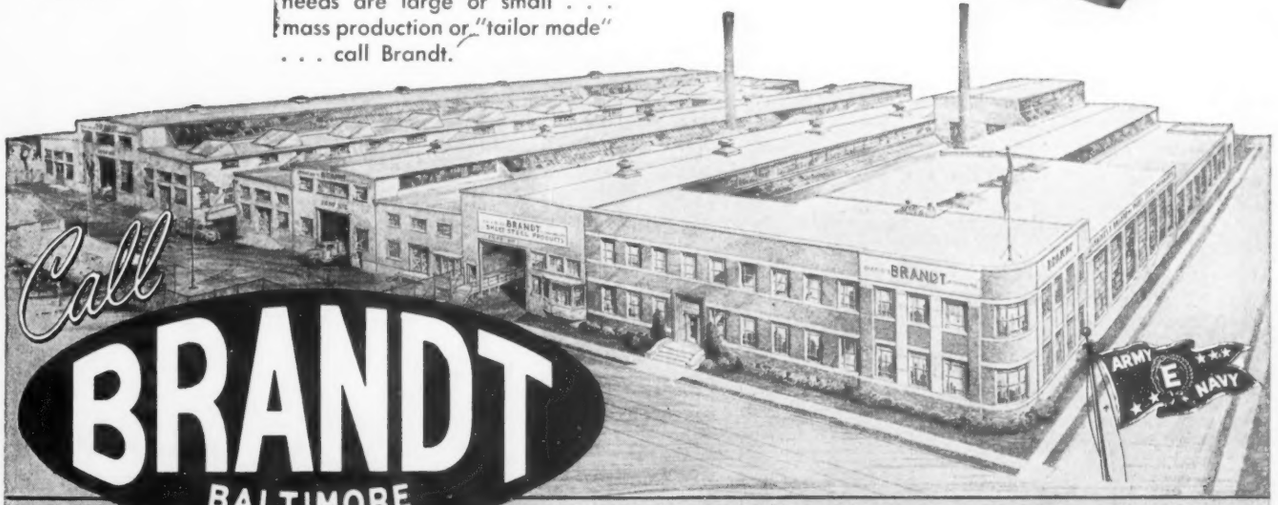
Free Catalog!

Write for this catalog. for illustrated details of the wide range of Brandt Facilities.

RANGE OF FACILITIES

The range of Brandt stamping facilities enables us to handle stampings from one ounce to 250 lbs. in: mild steel, stainless steel, aluminum, magnesium, or alloy metals.

Brandt services include: *fabricating, arc and spot welding, shearing, rolling, forming,* and *stamping.* Whether your metal needs are large or small . . . mass production or "tailor made" . . . call Brandt.



Call **BRANDT** BALTIMORE

CHARLES T. BRANDT, INC., 1700 RIDGELY ST., BALTIMORE-30, MD.

Precision METAL CRAFTSMEN SINCE 1890 ★ ★ ★ ★

The SOLUTION is the SAME!

PNEUMATIC TIRED★
—travels outside or inside buildings.
CAPACITY—Up to 9 Tons

—IF YOUR PROBLEM IS

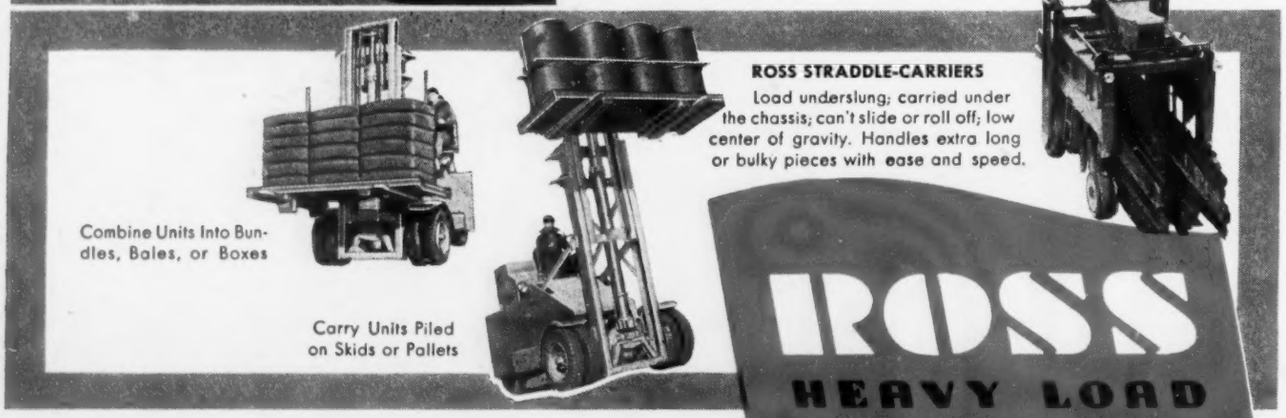
1. HEAVY MATERIALS HANDLING

Make Heavy-Load-Handling Simpler, Faster, Easier, Safer, Lower-Cost, in the critical reconversion and post-war production period, with Ross high-capacity Pneumatic-Tired Fork-Lift Trucks. Handle Loads up to 9 Tons—lifting, stacking, loading or unloading, conveying in or between buildings. Lift that heavy load off your mind by putting it up to Ross engineers, experienced more than a quarter-century in heavy-load-handling problems.

2.—or SMALLER UNITS COMBINED

on Pallets or Skids—in Boxes, Bales or Bundles

Reduce material handling labor, time and costs by combining units into single BIG "packages"—easily lifted, moved, and tiered or stacked high with Ross Fork-Lift Trucks. Write for details about this modern, money-saving equipment.



Combine Units Into Bundles, Bales, or Boxes

Carry Units Piled on Skids or Pallets

ROSS STRADDLE-CARRIERS
Load underslung; carried under the chassis; can't slide or roll off; low center of gravity. Handles extra long or bulky pieces with ease and speed.

ROSS
HEAVY LOAD
STRADDLE-CARRIERS & LIFT TRUCKS

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★ ROSS CARRIER COMPANY ★ Benton Harbor, Michigan

Branches: Seattle • Portland • San Francisco • Vancouver, B. C. • New York City • Hoboken, N. J.

Announcing 3 New Monarchs—

THE UNI-MATIC **THE MONA-MATIC** **THE SPEED-MATIC**

Monarch's answers to the problem of how to meet rising production costs:

- **For chucking and fixture work—The Uni-Matic**
- **For between-centers work—The Mona-Matic**
- **For hand-screw bar work—The Speed-Matic**

Each is unique—each is a radical improvement over conventional turning methods. You'll find brief information on the following pages. Let us show you how they'll give you increased production at lower cost, no matter how small your lot sizes. For complete specifications call your nearest Monarch representative—or write us direct.

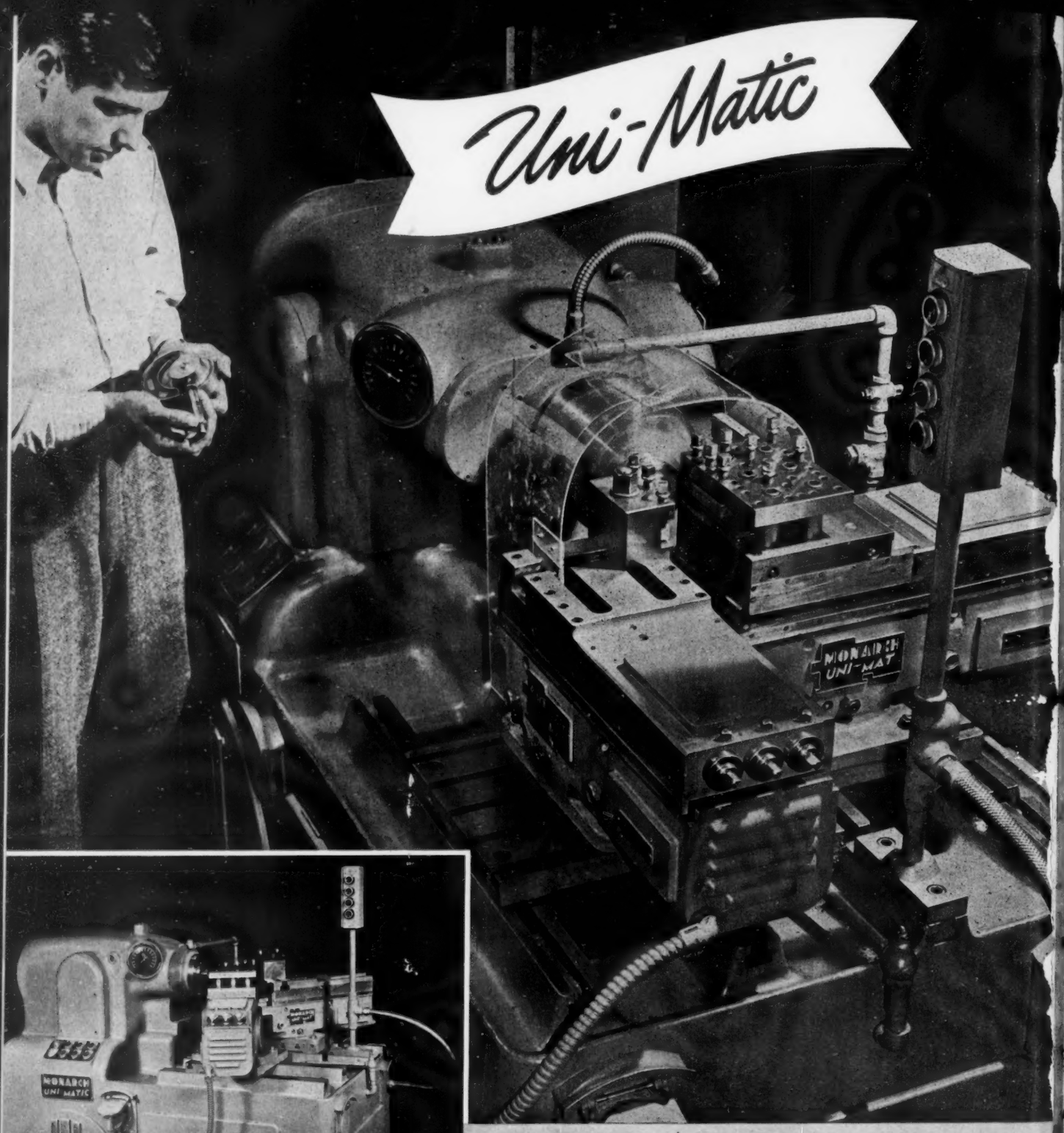
ACCURACY · ECONOMY · LONG LIFE

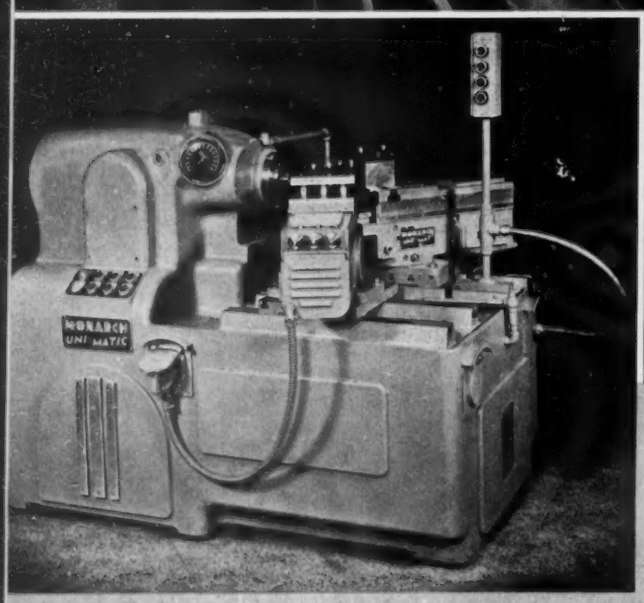
Monarch TURNING MACHINES

THE MONARCH MACHINE TOOL CO.

Sidney, Ohio

Uni-Matic





An automatic turning machine for chucking and fixture work —combines high production and extreme accuracy on turning, boring and facing operations. Broad range of spindle speeds up to 1000, 2000, 3000 and even 5000 rpm. Completely independent electronically controlled action of each interchangeable Uni-Mat (a motor-driven tool slide) permits universal positioning as well as universal tooling. Feed range ½" to 13" per minute, with rapid traverse of 100" per minute. Suitable for work as small as 1" and as large as 16" diameter.

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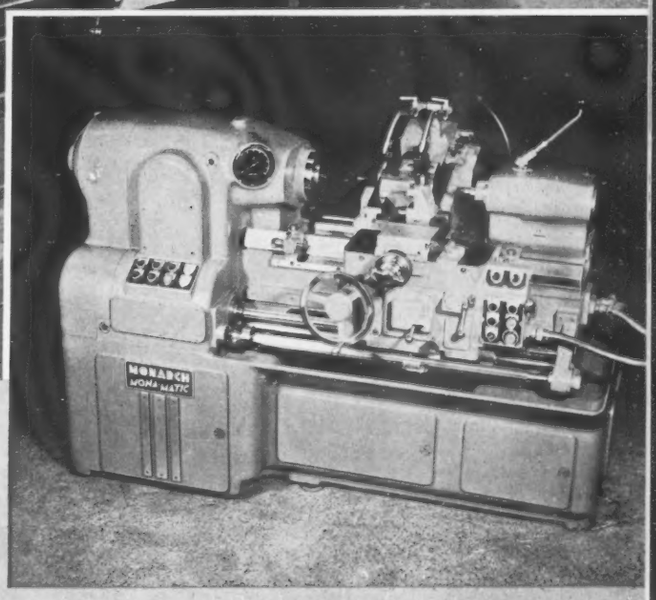
Monarch
TURNING MACHINES

THE MONARCH MACHINE TOOL CO. • SIDNEY, OHIO

Mona-Matic



An automatic turning machine for between-centers work, offering the same degree of high production and extreme accuracy as the Uni-Matic. Complete range of spindle speeds up to 1000, 2000, 3000 and even 5000 rpm. May be operated fully automatic, fully manual or in any combination. Power feed and rapid traverse return on front carriage; rear carriage may be added as separate unit. Swing over bed—15"; swing over front slide—8"; over rear slide—7½"; travel of front slide—4"; rear slide—3½".

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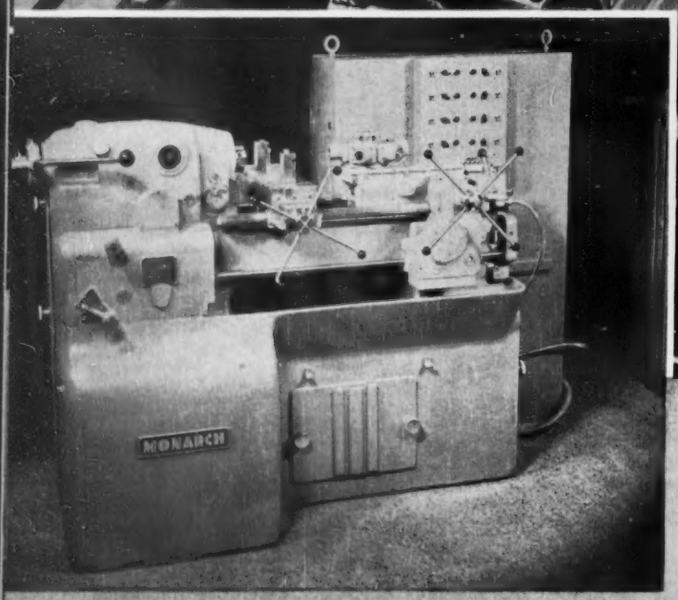
Monarch
TURNING MACHINES

THE MONARCH MACHINE TOOL CO. • SIDNEY, OHIO

Speed-Matic



A high production hand screw machine with power feed ram type turret, hand operated cut-off slide and preselected changeable spindle speeds—from 50 to 5000 rpm. Designed for maximum high production with extreme accuracy on lots of 25 to 500 or higher. Automatic electronic speed change through as many as ten stations insures using most efficient cutting speed for each operation. Feeds from .0005" to .016" per revolution. Collet chuck capacity ⅞".

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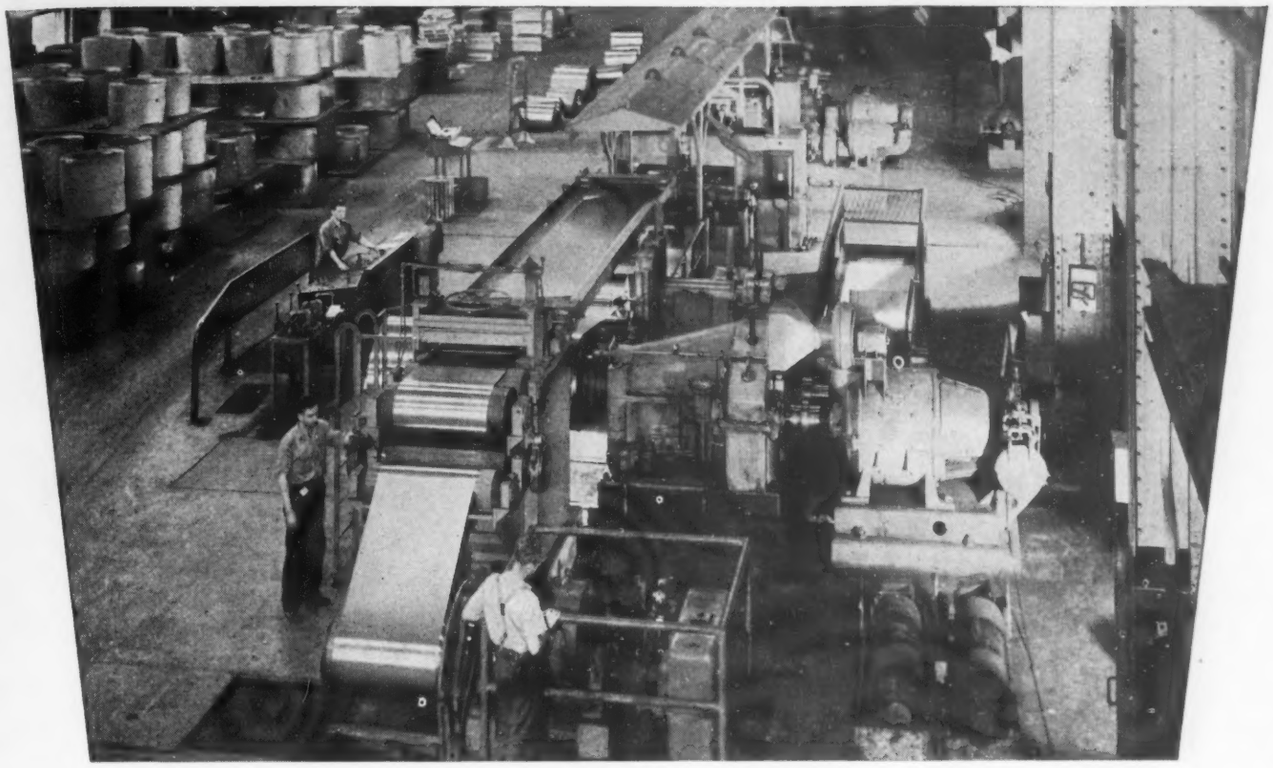
Monarch
TURNING MACHINES

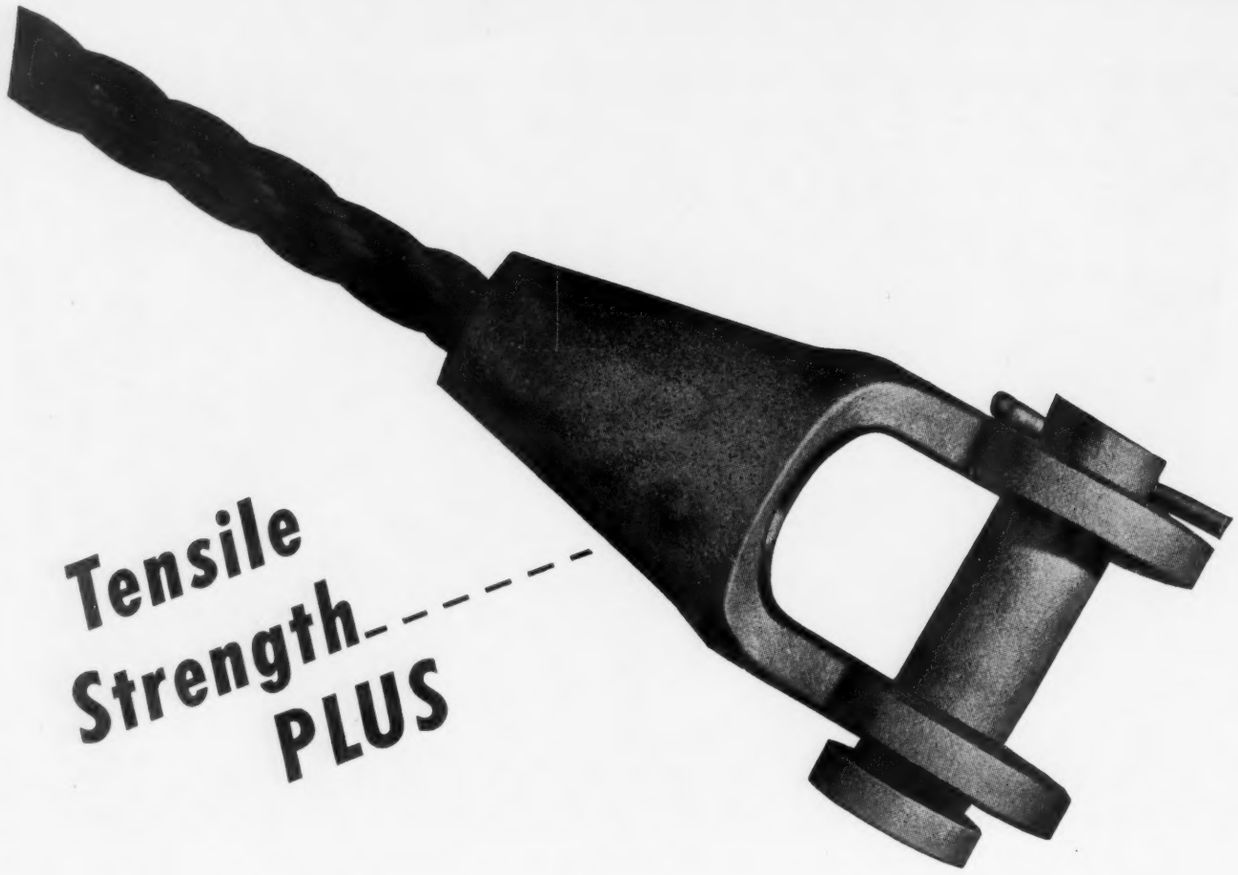
THE MONARCH MACHINE TOOL CO. • SIDNEY, OHIO



● *Built by* RELIANCE ELECTRIC & ENGINEERING CO.

FROM ZERO TO 1900 FPM

The smooth performance of the Reliance Motor-drive on the exit end of this variable-voltage, side-trimming line is not jeopardized by bearing trouble. For SKF Bearings help it to provide a full range of linear speeds, from low threading and inspection speeds to a maximum production speed of 1900 feet per minute. Motor life is extended. Armatures are properly aligned. The initial air gap is maintained indefinitely. Maintenance costs are drastically reduced. Put all these advantages together, and you can easily see why it's so important to put the right bearing in the right place. 6079



A leading foundry has been casting these wire rope sockets for 35 years. And during that time, not a single instance of failure in service has been reported.

As this product found wide war uses, special tests were made to determine its strength. In every case, the tests indicated a big margin of safety over the minimum tensile strength requirement, with strength uniform in *all directions*—not merely strength in one direction at the expense of others.

TESTS PROVE IT

Test Number	Tensile* Strength	Yield* Point	Reduction in Area
1	249300	217730	18.8%
2	229880	212700	24.5%
3	198300	179230	23.4%
4	186300	174830	29.7%
5	219070	181820	21.7%
6	234650	215520	20.6%
7	220080	204700	26.8%
8	185030	165540	21.3%

*Pounds per square inch

Production cost is far below that of any other method of fabrication.

The chart, shown at the left, gives tensile strength in a series of heats—a property that can be specified in advance.

With steel castings you can write your ticket for *any* property, or *any combination* of properties—and then get exactly what your end purpose requires.

Could there possibly be a more versatile, or a more economical, material from which to make the better products the market now demands?

Your steel foundry will gladly work with you toward the virtues and the economies steel castings have for you. Or you may consult Steel Founders' Society, 920 Midland Bldg., Cleveland, Ohio.

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The REMARKABLE HANSEN PUSH-TITE COUPLING

The remarkable Hansen Push-Tite Coupling has won top honors as the outstanding coupling on the market based on its performance—economical performance. That is the reason why there are more Hansen Couplings used by large and small manufacturing plants than any other coupling. Its simplicity in design, ease of operation, "air savings" and long trouble free life means speed, increased production coupled with economy all along the line.

Hansen Push-Tite Coupling is unique in that it is easy and fast to operate, just a slight push of plug into socket—it's connected, locked and air is automatically turned on. Slide sleeve back with thumb it is unlocked, disconnected and air is automatically shut off. There is no turning, adjusting or twisting of parts in order to connect, disconnect or to turn air on or off. It's all done by an easy push on plug to connect and a slight push on sleeve to disconnect. Complete swivel action prevents kinking of hose. Hansen Couplings will handle pressures from a few ounces to over 10,000 pounds without leaking.

Hansen Push-Tite air hose couplings are used for air, oil and grease. There are also other Hansen Couplings made to handle gasoline, acetylene and oxygen.

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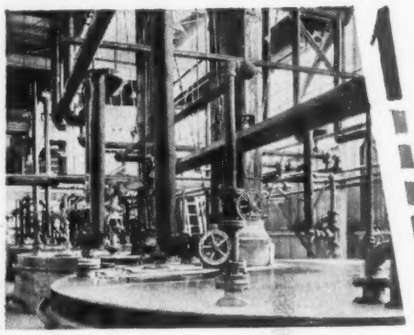
The 1, 2, 3

OF LICKING YOUR ACID PIPE PROBLEMS

The problem of controlling corrosion in the conveying of acids and other corrosive solutions is tough enough to begin with. But it is further complicated by such factors as elevated or fluctuating temperatures, pressure, vacuum and vibration or other mechanical stress of equipment.

That's why National Lead — as a result of its years of experience in every field handling corrosive solutions and gasses — makes available to you the wide variety of pipe described below. And why we offer you the first-hand "know how" gained by our technical staff from thousands of installations, to help you select the right pipe for every acid-conveying job.



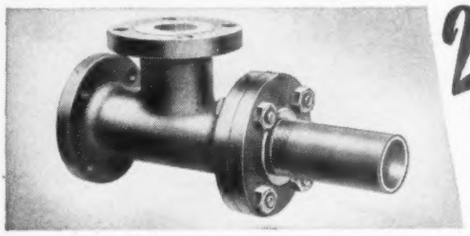
Making acid toe the line . . . Chemical Lead Pipe and Fittings employed in connection with a battery of digestors in a large industrial plant.

1 **Lead Pipe.** Widely used throughout industry is our standard Chemical Lead Pipe. Made of highly pure lead, it has a long record of successful applications. Like all of our lead pipe and pipe lining, it is fabricated by an extrusion process which assures uniform wall thickness, free flow and freedom from porous or defective spots.

Other highly useful types are made by alloying small amounts of other metals with the chemical lead.

For example, there is Tellurium Lead Pipe. This has added corrosion resistance at high temperatures and the ability to toughen and increase its tensile strength under mechanical stress. Still a third property — due in part to its capacity to work-harden — is a higher endurance limit and therefore greatly improved resistance to failure under vibratory stress.

Again, there is Antimonial Lead Pipe, made with a base of either chemical or Tellurium lead. When the antimony content is 6%, this insures a mechanical strength about twice that of chemical lead. And the greater hardness also means improved abrasion resistance — a real advantage where erosion is a problem. Recommended only for temperatures below 240° F.

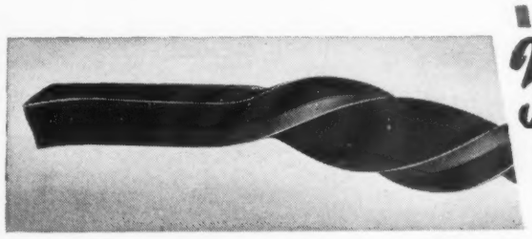


The strength of steel or iron, plus the corrosion resistance of lead . . . twin advantages of this "United" Lead-lined Pipe. Note the uniformity of the lead lining.

2 **Cold Expanded Lead-Lined Pipe.** Where the strength of iron or steel is needed — for example, to withstand pressure or other mechanical stress—our "United" Lead-lined Cast Iron or Steel Pipe has proved highly serviceable. It has the outer strength needed plus the inner resistance of its lead lining to corrosion.

The lining is fabricated in continuous lengths of uniform, seamless pipe, then cold expanded inside the iron or steel tube. This assures a tight fit and a lining smooth, uniform and free of defects.

Cold Expanded Lead-lined Pipe, as well as the "United Tubond" described below is made in flanged sections, with the lead lining carried over the face of the flange to give a positive lead-to-lead joint. Moreover all iron and steel pipe used meets the standards of the American Society of Testing Materials.



Once bonded . . . it stays bonded! A section of "Tubond" Lead-lined Steel Pipe, twisted to prove the inseparability of the metals. Steel and lead are married to stay.

3 **"United Tubond" Lead-Lined Pipe.** To do a job where equipment must stand extreme vibration, pressure, vacuum or temperature change — National Lead has developed "United Tubond" Lead-lined Pipe. The lead lining is bonded to the iron or steel tube by a special process, so permanent that there can be no separation or creep of the lining.

As shown in the illustration, the steel or iron can be violently twisted, but there will be no let-go of the lead.

A complete line of standard lead and lead-lined fittings is available for use with the various types of pipe. In addition, National Lead manufactures lead-covered pipe to individual specifications.

No matter whether you want a single valve . . . sheet lead for lining a tank . . . or a complete acid recovery plant . . . National Lead can supply you. You are invited to consult our technical staff on any equipment problem.

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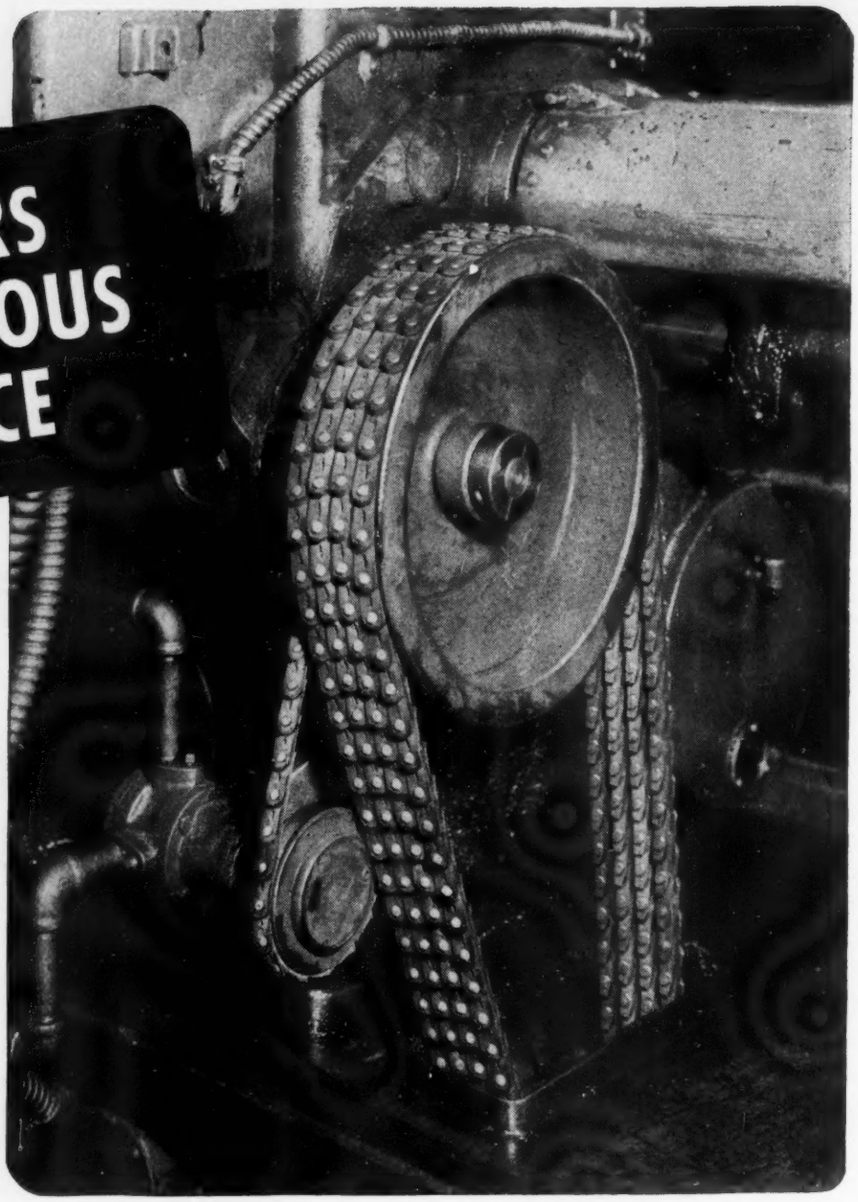

Two Veelos V-belt drives on No. 5 Gisholt Lathe. 4 Veelos "B" belts operate the main drive; 1 Veelos "B" belt operates the oil pump.

ON FEBRUARY 3, 1944, five Veelos V-belts were installed on this No. 5 Gisholt Lathe—located in a large steel plant. They have been in continuous operation ever since—*under severe conditions. Yet these belts have never once been adjusted and are reported remarkably free from slip.* Idlers used on the former belt installation were removed when Veelos went on.

On all V-belt drives that call for uniform belt tension without difficult adjustment and for freedom from slip, link construction makes Veelos the logical choice because:

Link Construction Maintains Uniform Tension

Easy adjustment of Veelos length assures that each strand of a multiple V-drive carries its exact share of the load. All strands constantly work together, *delivering full power.*

Link Construction Ends Slip

Veelos link construction provides quick, easy tension adjustment to end slip . . . keeps machinery running at full speed and productivity.

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LINK CONSTRUCTION UPS PRODUCTION

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HOURS 43		AMOUNT 48.95	STATE U.C.	BALANCE DUE 43.71
		TAX EXEMPT.	BONDS 3.75	
		TAXABLE BAL.		

	1st DAY	2nd DAY	3rd DAY	4th DAY	5th DAY	6th DAY	7th DAY	
16								
15					FR 2030			
14					FR 1733			
13								
12	Σ 1701	≥ 1700		TH 1703	FR 1704			
11			≥ 1659					
10								
9								
8								
7		≥ 1259	≥ 1258	TH 1258	FR 1300			
6		≥ 1200	≥ 1201	TH 1204	FR 1202			
5	Σ 1158							
4	Σ 1100							
3								
2		≥ 801						
1	Σ 800		≥ 800	TH 759	FR 758			
Daily Totals	8-	8-	8-	8-	11-			43

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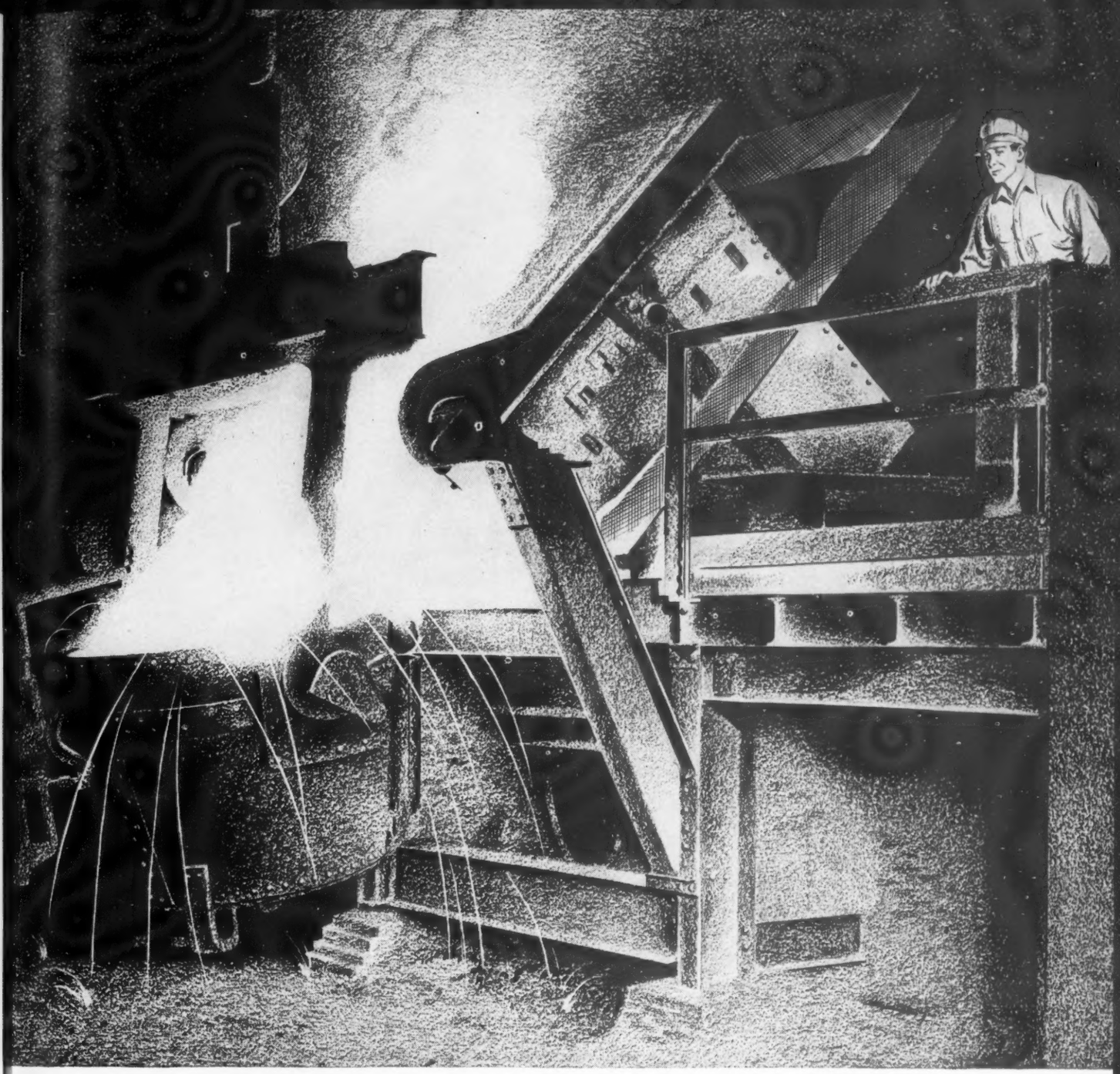

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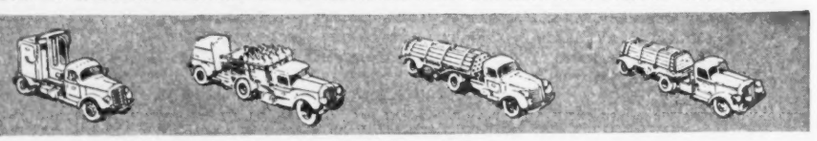

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we get greater hardness and lower cleaning costs"—

says the Chief Metallurgist of this Plant

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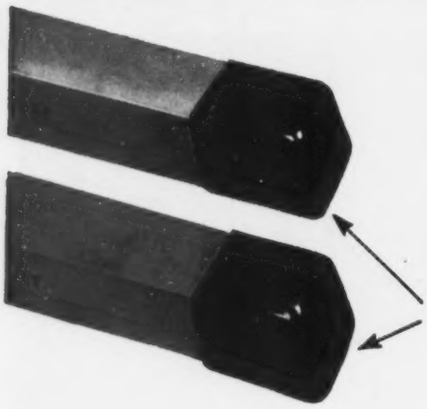

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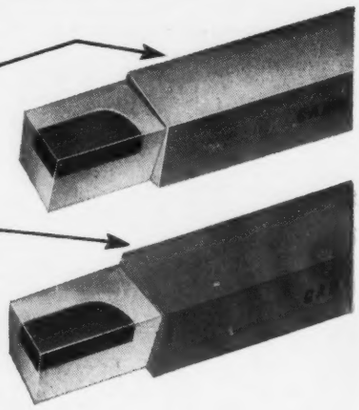

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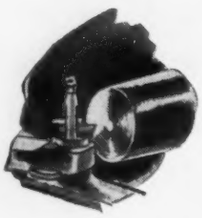

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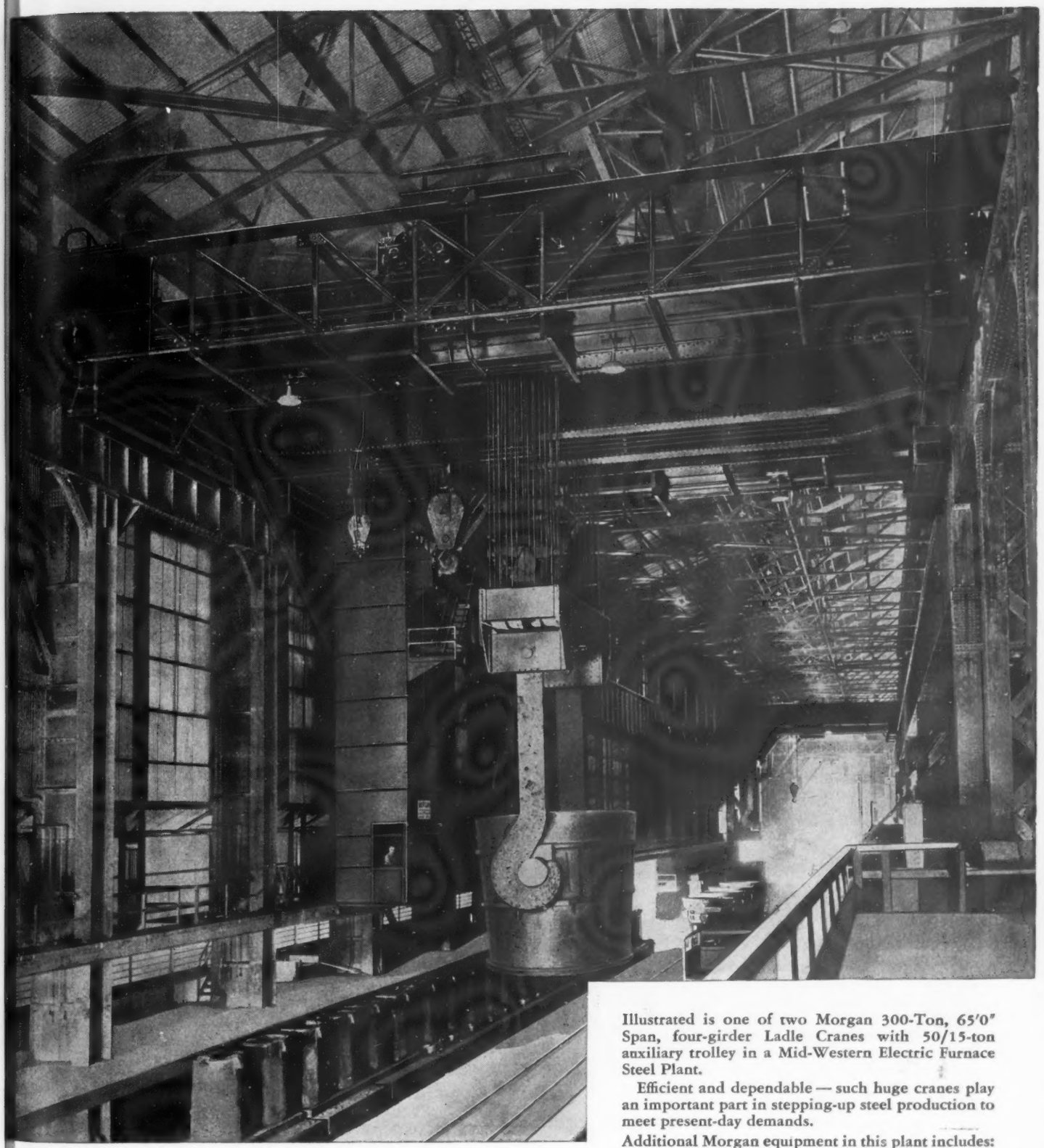

MORGAN 300-TON, 65′0″ SPAN POURING CRANE

Illustrated is one of two Morgan 300-Ton, 65′0″ Span, four-girder Ladle Cranes with 50/15-ton auxiliary trolley in a Mid-Western Electric Furnace Steel Plant.

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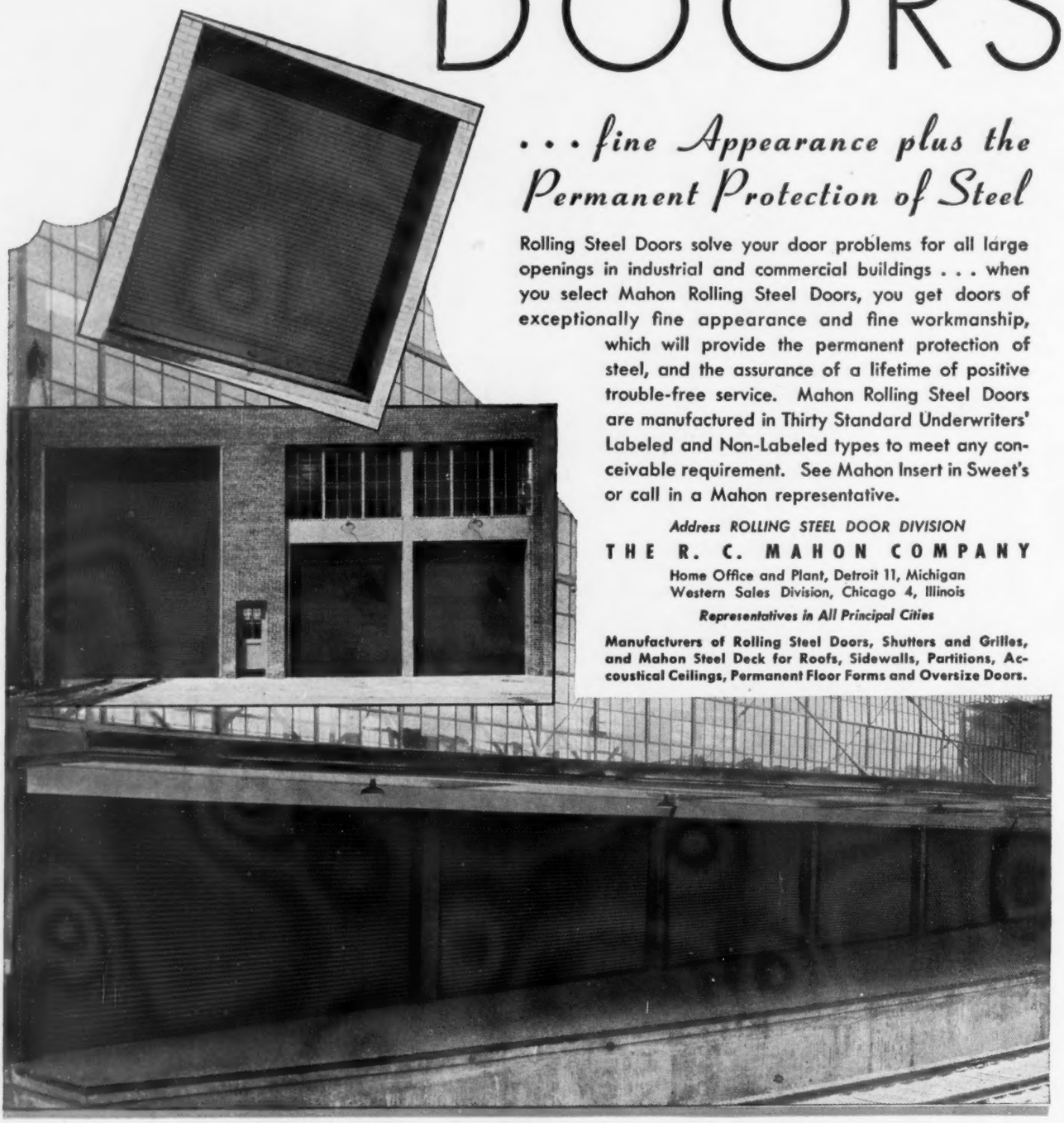

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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 118, NO. 14 APRIL 8,1946

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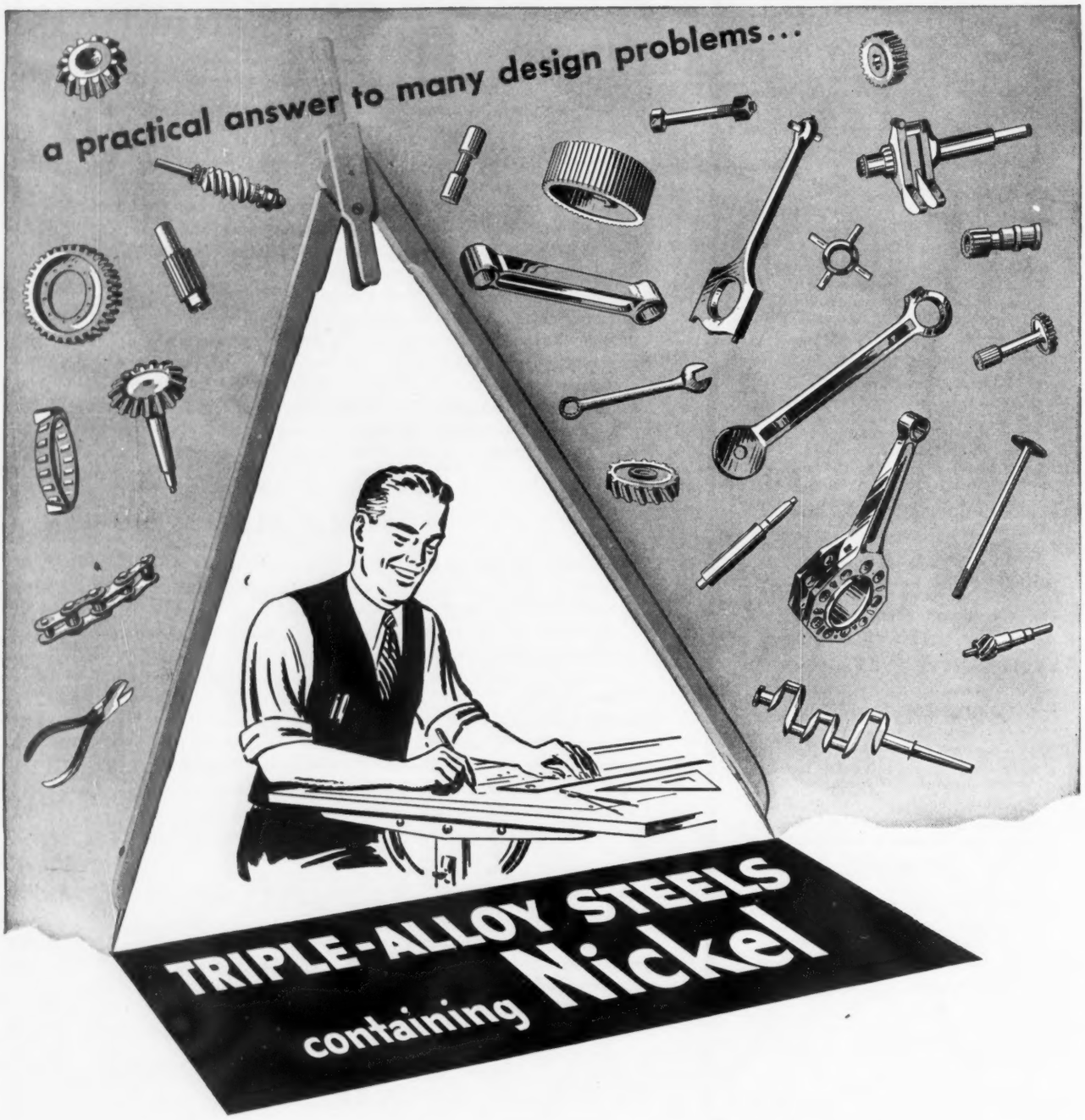

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As the EDITOR VIEWS the NEWS

A Congressman Replies

In the March 25 issue, the editorial appearing on this page pointed out that while persons in high government positions give eloquent lip service to the importance of preserving the American system of private enterprise, they condone actions by government which commit persistent sabotage upon the system.

A reader made a copy of this editorial and sent it to his congressman with a letter urging him to institute proceedings leading to the impeachment of a certain cabinet officer. The congressman replied as follows:

"I read the photostatic copy of the page from the magazine STEEL with considerable interest. I agree with every word of it, but frankly, the magazine went just about as far as any magazines go, and that is their failure to recommend a practical correction of the evils which exist and there is only one correction possible, which is a defeat of the New Deal at the polling places. I would have liked the editorial much more if it had concluded by advising the readers to get active in communities and in sections of communities where the New Deal is strong; support anti-New Deal candidates and to support them in between election time as well as at election time."

The congressman's words provide timely emphasis on a point that often is overlooked by businessmen. Frequently the executive in industry judges action by government purely from an economic or social standpoint. The public servant on the firing line in Washington likewise considers government policies from broad economic and social standpoints, but at the same time he has to take into account certain political factors. Too many businessmen fail to understand the vote-getting problems which constantly confront their elected officers and representatives in Washington.

This aversion to the realities of practical politics on the part of industrial executives is particularly unfortunate at this time because other groups—notably members of unions and followers of left-wing leaders—clearly recognize the importance of grass roots politics and are playing it for all it is worth.

The congressman's formula is good. The only way businessmen can correct the evils of which they complain is to elect anti-New Deal candidates. This means hard work at the community level and consistent support at all times of those in Congress who are opposing the destructive features of New Deal policies.

Some bad New Deal proposals were blocked in Congress last week. Did you commend your representatives for their good work?

MULTIPLE ORDERING: Right now, when spokesmen for the administration are gloating over favorable statistics on industrial activity and national income, is a good time for industrialists to stick to realities and to avoid being misled by government propaganda which since V-J Day has been almost 100 per cent wrong.

One approach to reality is to appraise demand accurately. A. H. Allen reports that buyers have spoken for 275,000 Frazer and 270,000 Kaiser automobiles and then adds significantly: "Frazer is not kidding himself that all these buyers will prove as good as their intentions, since it is known that thousands of prospective car buyers have placed orders with several dealers and will take the first car that comes along, canceling whatever orders they have entered or perhaps selling their priorities to friends."

This practice of multiple ordering is not confined to automobiles. It is prevalent in many lines of materials, parts, equipment and supplies. This may explain why the National Association of Purchasing Agents finds that in Canada some of the pre-

(OVER)

dicted and expected demand for certain merchandise and appliances has failed to materialize.

American manufacturers have had bitter experience with multiple orders in the past. They should be doubly alert to their danger now. —pp. 62, 78

° ° °

FRIEND, FOE ARE BACK: In this issue the editors resume the publication of two services—one with eagerness and pleasure and the other with reluctance and regret.

Welcomed back as a valued feature of "Mirrors of Motordom" is the tabulation of automobile production statistics, including monthly totals since the first of the year and weekly estimates up to the date of publication. These current monthly and weekly figures are compared with production in the like periods of 1941—the last prior year in which output could be considered normal.

The other service resumed in this issue is the summary of rulings by OPA, CPA and other agencies under the title "Government Control Digest." A similar digest was discontinued last fall when scores of government restrictions were abandoned. Resumption of the service is prompted by the mounting number of government controls affecting industry. We hope conditions will make it possible to discontinue this digest at an early date.

—pp. 77, 69

° ° °

IS THIS THE ANSWER? Precision casting, as refined and developed under the stern necessities of war, presents intriguing possibilities to design and production engineers in peacetime. Those who were privileged to tour the plant of the Haynes Stellite Co. in Kokomo a few weeks ago were impressed by the technological advances that have been made in this process in a few brief years.

Precision cast parts may be the answer to the new demands for metals that will withstand the high temperatures involved in gas turbines, jet propulsion units and other recent developments. —p. 96

° ° °

COSTLY EXPERIMENT: So far the government's housing program does not set too well with industrialists.

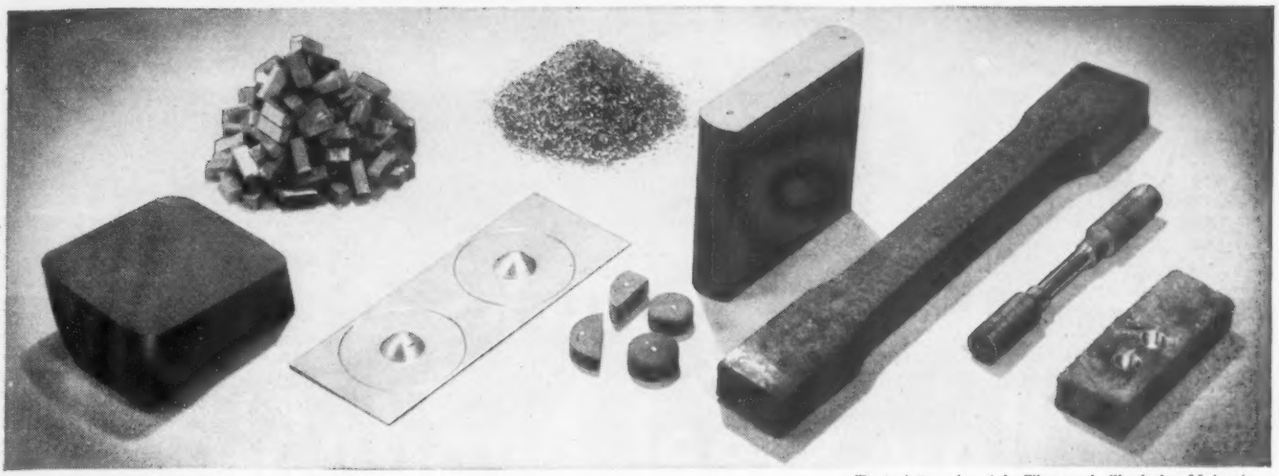
For one thing, rulings issued to date need clarification before they can be applied. Secondly, industrial executives know that no matter how important their own building projects may be, government red tape will delay them. Thirdly, there is well-founded doubt as to whether the housing program will serve its intended purpose.

Industry may have to postpone important work while government experiments with a plan that will do little to help veterans. —pp. 63, 66, 68

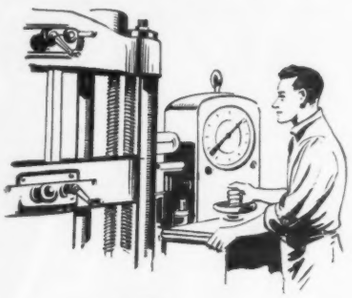
SIGNS OF THE TIMES: Every purchaser of castings should read the impassioned letter (p. 118) written by the president of a leading pattern lumber manufacturer to the engineering editor of this publication calling attention to the serious shortage of pattern lumber. The implications of this situation reach far beyond the pattern shops and casting plants of the nation; they involve almost every manufacturer in the metalworking industries and call for vigorous action on a broad front. . . . One outcome of the recent fiascoes in the government's handling of labor disputes has been a general overhauling of the United States Conciliation Service (p. 71), even to the extent of inaugurating a training school to teach conciliators how to conciliate. . . . On the first day of the strike of Detroit bus and streetcar operators (p. 77) absenteeism in industrial plants mounted to around 15-18 per cent from a normal of 5-7 per cent. On the second day absenteeism dropped almost to normal, indicating the potency of private automobiles in a transportation emergency. . . . Republic Steel Corp., with the largest backlog of orders in history, reports to stockholders (p. 80) that it has acquired rich iron ore properties in Mexico. . . . Caterpillar Tractor Co. has announced plans for expansion which will add 41 acres of floor space to its Peoria plant. Major project (p. 81) is a new diesel engine plant. . . . United States Tariff Commission has issued a report (p. 82) stating that iron and steel exports from the United States will increase substantially in the early postwar years, but may taper off later as the competitive position of European producers improves. . . . If you want to know how the House Ways and Means Committee is likely to react to proposals for extending social security, read the 742-page "Issues in Social Security" (p. 70), which deals with the fundamentals of this controversial subject. . . . Now that wartime precautions are relaxed, it is possible to present certain information on the manufacture of Smithway hollow steel propeller blades. Atmosphere heating of parts of the blades for forging (p. 90), by which scaling was prevented and closer tolerances maintained, may have important peacetime applications. . . . Prior to the strike bituminous coal production in 1946 was 6 million tons ahead of output in the comparable period of 1945. Loss of production last week (p. 150) put production to date far behind comparable 1945 output.

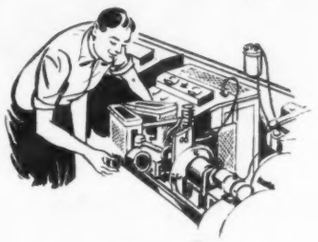
E. L. Shaner

EDITOR-IN-CHIEF



Typical Samples of the Thousands Checked to Maintain Quality and Uniformity in Inland Steels





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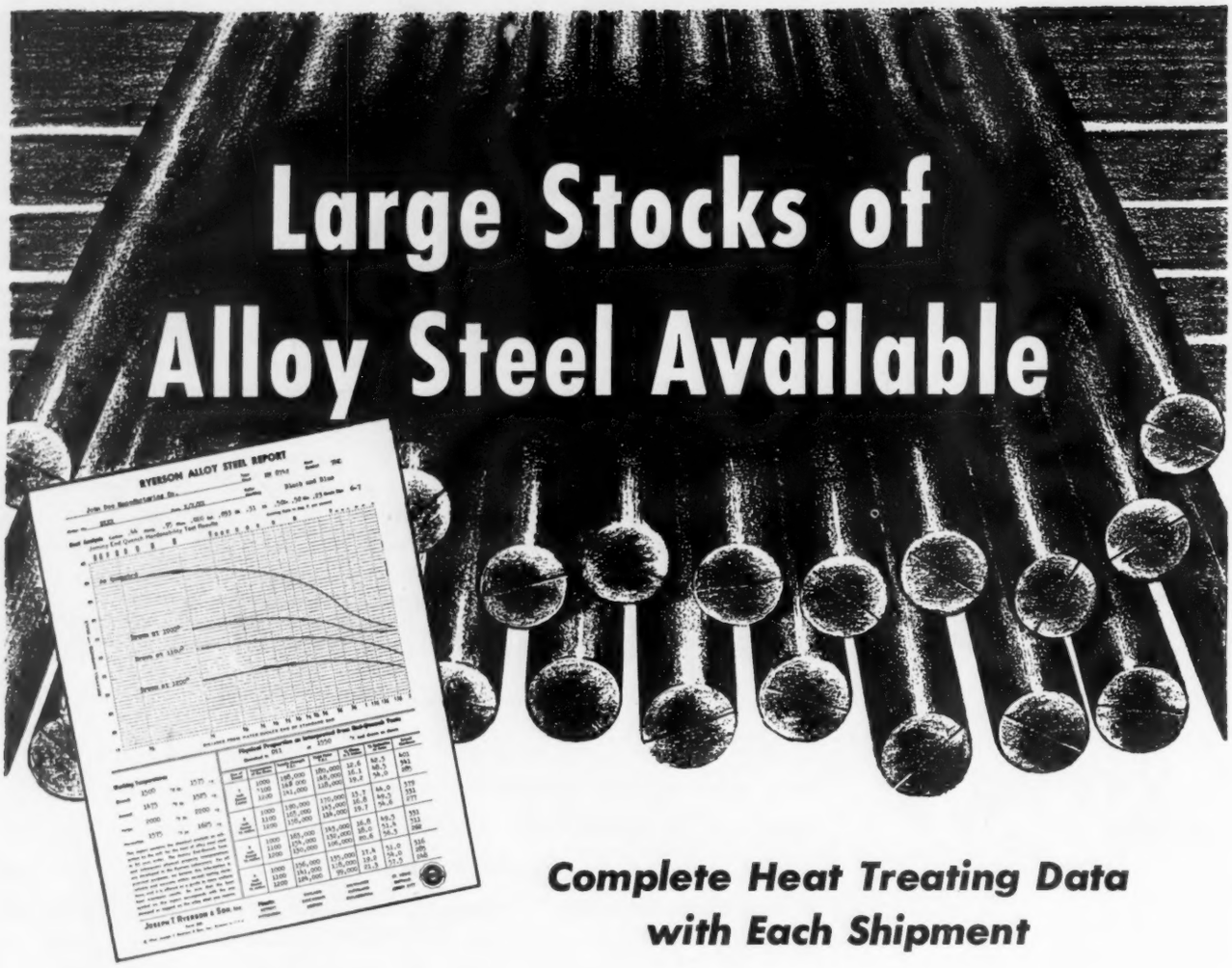

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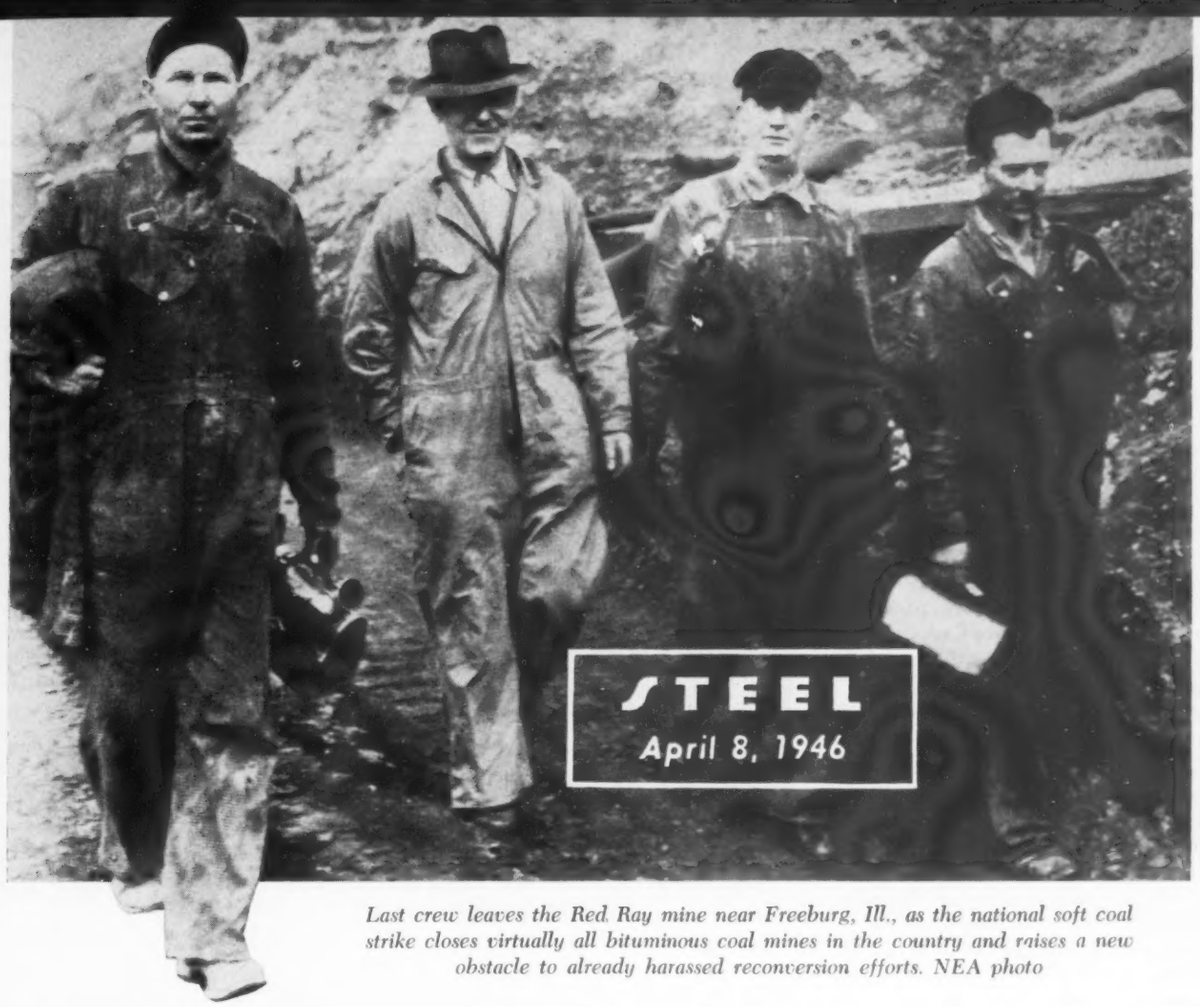


Last crew leaves the Red Ray mine near Freeburg, Ill., as the national soft coal strike closes virtually all bituminous coal mines in the country and raises a new obstacle to already harassed reconversion efforts. NEA photo

Gradual Slowdown of Metalworking Activity Threatened by Coal Strike

First week of mine shutdown brings 8-point drop in ingot production. Curtailment will increase sharply as stoppage continues. Cessation of steel shipments will be quickly reflected in consumers' plants where stocks are extremely low

PROGRESSIVE contraction of metalworking activities, just well started on an upward swing following the first quarter's plague of strikes in basic steel, automotive, electrical, steel fabricating and miscellaneous industries, will follow the nation-wide shutdown of soft coal mines.

Hardest and most immediately hit by the coal strike will be the basic steel industry which suffered an 8-point reduction in operations to 81.5 per cent of capacity during the first week.

The cut in steel mill operations will be reflected quickly in other metalworking plants, for steel stocks have been extremely tight ever since V-J Day and were made more critical by the month-long shutdown of the basic steel industry.

Steel mill stocks of coal generally ranged from two to four weeks when the mines shut down. Many plants continued to operate at near-capacity levels last week in the hope that the mine strike would be of short duration and that steel mill operations would not be drastically affected. As the coal strike dragged through its first week without visible progress toward settlement, steel mill operators began to plan for sharper reductions in operations.

The sharpest reduction effected last week was at Pittsburgh where Carnegie-Illinois Steel Corp. reduced operations at its Clairton works to 38 per cent of capacity, banked its 2800 beehive coke ovens and banked 20 of its 32 blast furnaces. Ingot production in all United States Steel Corp. subsidiaries in the Pittsburgh area was cut to 47 per cent of capacity. Production of plates, shapes, alloy and carbon bars, pipe and to a lesser extent sheet and tin plate also was sharply reduced. Output of wire was little affected.

Steel Corporation ingot output loss last week was estimated at 115,000 tons, with schedules this week calling for a further reduction. Five thousand workers in U. S. Steel's Pittsburgh plants were made jobless as the result of the coal shortage.

In other districts the early effects of the coal strike were less severe. Birmingham steel operations continued at about 95 per cent; both major operators were reported to have coal stocks sufficient for three weeks and plan no immediate curtailment.

Chicago district steel operations were maintained at 92 per cent, but continuation of the coal strike will force a substantial reduction this week. Coking coal stocks average between three and four weeks, with another five or six days' supply in transit. Cessation of shipments from mines will signal the reduction, with Carnegie-Illinois planning to drop to 40 or 50 per cent. Consuming industries in some cases are being affected already, with Ford Motor Co. lay-

ing off 2000 production workers at its Chicago assembly plant.

Coal stocks of Great Lakes Steel Corp. at Ecorse, Mich., currently aggregate about 30 days' supply at the present rate of operations, and on the basis of the present mix of 75 per cent high-volatile and 25 per cent low-volatile grades. While this might be stretched to around 35 days by reducing the "mix" to 20 per cent low-volatile, the latter does not yield coke entirely suitable to blast furnace operations and is considered only an emergency step. Some inventory of coke was built up during the steel strike and this is now being consumed. Coking operations average 75-80 per cent of capacity but will be reduced sharply soon if it appears the miners' strike will be protracted.

Youngstown operations dropped off 10 points last week as result of curtailment at Carnegie-Illinois' Ohio works, where three blast furnaces, a bessemer and five open hearths were suspended.

Cleveland district mills were maintaining operations and mills had a three to four weeks' coal inventory at the start of the strike. One company is considering going on a four-day week in finishing mills should the coal strike continue for several weeks.

On the West Coast, Columbia Steel Co., subsidiary of U. S. Steel, notified the Mountain Fuel Supply Co. of Salt Lake City it would be forced to curtail the supplying of coke oven gas to that company immediately. Columbia Steel had only enough coal for 15 days' operations when the strike started and planned to taper coke oven operations to stretch supplies and to maintain a reserve to keep coke ovens heated should the strike be of long duration.

Utilities Have Substantial Supplies

Coal inventories of railroads and utility companies are less worrisome than those of the steel producers. Most utilities have a two to three months' supply and the railroads have "substantial" reserves.

The comfortable supply held by the large utility companies generally presages an uninterrupted power supply for many metalworking industries. The big worry of these latter companies is the curtailment of steel shipments.

Spokesmen for the automotive industry last week estimated auto producers would feel the cut within a week after it hit the steel producers. Ford last week started to lay off 35,000 workers on account of the steel shortage. Other steel consumers are in similar circumstances.

Whatever the eventual loss of steel

(*Please turn to Page* 170)

United States Conciliator Paul Fuller, left, meets, at the Shoreham Hotel in Washington, with representatives of the United Mine Workers. Others in photo are, left to right: Thomas Kennedy, secretary-treasurer; John O'Leary, vice president; and John L. Lewis, president. NEA photo

Reconversion Director Claims Civilian Production at Highest Level in History

A BRIGHT picture of America's business and prosperity—actual and prospective—was painted in the sixth quarterly report on reconversion, issued last week by John W. Snyder, director of the Office of War Mobilization and Reconversion.

Mr. Snyder's report said in effect that the administration's program hasn't been retarded seriously by price problems or strikes. The major issues of wage and price adjustment have been met in a way to stimulate production without losing vital ground to the force of inflation, it asserted.

This statement caused raised eyebrows by persons who recalled that 8 million tons of steel production were lost in the recent steel strike, that General Motors was closed for about 4½ months, that the electrical industry was tied up by a long strike, that the report was made soon after the nation's soft coal miners had walked out of the mines, and that eight months after the war's end a great many commodities are not yet available.

Among the high points of Mr. Snyder's report were these statements:

Total civilian production is now at the highest level in the nation's history—more than $150 billion a year.

Nonagricultural employment is now higher than before V-J Day. Totaled 44.7 million in February.

Private wage and salary payments have now returned to the pre-V-J Day level of $82 billion annually.

Rate of consumer and business purchases in first quarter of 1946 equalled the Christmas boom.

Unemployment, though increasing, was still below 3 million in February.

Barring further serious work stoppages, production should rise sharply during the second quarter of 1946 and jobs should be available to most of the added workers.

Wheeling Steel Exercises Option on Mingo Works

Wheeling Steel Corp., Wheeling, W. Va., announced last week that the option on the Mingo plant of Carnegie-Illinois Steel Corp. has been exercised involving the purchase. The corporation has no intention of operating the plant immediately but has engaged A. J. Boynton & Co., steel mill engineers, Chicago, to study the development of the property, which consists of 156 acres of plant site, three blast furnaces and auxiliary equipment and use of additional acreage for disposal of plant waste. The property is located near the Steubenville plant of Wheeling Steel Corp. Options are held on privately owned property on the east side of Mingo, which will be exercised later.

Effect of Curb on Factory and Commercial Building Uncertain

Further clarification of government order held necessary. Structural steel fabricators fear widespread unemployment may be experienced unless control regulation is administered realistically by regional offices

IT WAS not certain last week to what extent industrial and commercial construction will be affected by the government's recent curb on so-called nonessential building to divert building materials into the veterans housing program.

Some trade observers are optimistic that administration of the order will not drastically cut off necessary factory construction. Others, however, said the situation at present was too confused to permit of any firm opinion, declaring further clarification of the order is necessary.

The Civilian Production Administration issued a list of interpretations of its new construction controls late last week. In its interpretation the CPA ruled that applications for factory construction, if the product to be produced in the plant has been determined by CPA to be critically short nationally, will be approved.

To what extent the $327 million expansion program of the iron and steel industry will be held up by the order still is uncertain. Steel industry representatives last week were trying to get some clarification from Washington.

Despite the government curb on building no early material easing is expected in the delivery position of structural shape mills which have substantial order backlogs on hand. Practically all shape producers are quoting late second half delivery.

Some adjustment in mill schedules is expected as time passes and less heavy tonnage develops with the building suspension curb clamped down on various types of construction. It is expected, however, there will continue to be a substantial volume of heavy construction, such as bridges, tunnels and certain types of government buildings exempted under the government ban. Further, many projects of an industrial character are expected to win final approval, especially heavy mill type strucures where major requirements are items of steel in no way critical to the housing program. Steel items critical to the housing program include principally sheeting for heating and ventilating and roofing, and pipe and nails, as well as to some extent reinforcing bars.

Structural steel fabricators are not so cheerful. The American Institute of Steel Construction last week warned that unless the most skillful management is given to operation of the veterans housing program order, widespread unemployment among veterans may result from drastic control of industrial building construction.

Paul Coddington, president of the institute, pointed out that while adequate housing for veterans at the earliest possible moment is essential, immediate attention also must be focused on the need for steadily increasing employment.

"We are receiving calls from worried manufacturers in many lines, who fear their plans for building additional plant facilities will be completely cut off," Mr. Coddington explained. "It is a fallacy to believe that there is anything like adequate manufacturing space in the locations where its need is critical.

"From the veteran's point of view, a job is a first necessity, in many cases coming even before a suitable home.

"It is also a fallacy to believe that the entire building industry can be employed on small house construction.

"The 75,000 workers in structural steel fabricating plants are among those whose work with heavy steel construction will be abruptly stopped if no allowance is made for urgent industrial and commercial building. Workers in marble, terrazzo, decorative wrought iron and other trades employed on large buildings also would be affected."

Present, Past and Pending

■ CRUCIBLE STEEL BUYS 24-INCH BILLET, BAR MILL
NEW YORK—Crucible Steel Co. of America has placed an order with United Engineering & Foundry Co., Pittsburgh, for a six-stand 24-inch billet and bar mill for its Midland, Pa., plant.

■ UNITED ENGINEERING LEASES NEW CASTLE FOUNDRY
PITTSBURGH—United Engineering & Foundry Co. has completed negotiations with War Assets Administration for leasing of the New Castle, Pa., plant, thereby doubling peacetime capacity for production of rolling mill equipment, forging presses and industrial machinery.

■ ST. LOUIS LINE ORDERS 200 YELLOW COACH BUSSES
ST. LOUIS—St. Louis Public Service Co. has ordered two hundred 40-passenger busses from Yellow Coach Division, General Motors Corp. for delivery beginning June 1. Cost will be $2,800,000.

■ BETHLEHEM STEEL DEVELOPING S. AMERICAN MINES
BETHLEHEM, PA.—Bethlehem Steel Co. is developing extensive iron ore properties in Chile and Venezuela. Bethlehem has ordered three large ore carriers for delivery this year and four others for delivery either late this year or early in 1947.

■ CEILINGS RAISED ON SOME SILICA, FIRECLAY BRICK
WASHINGTON—Ceiling prices of silica and fireclay refractory brick produced in Missouri and eastern states have been increased 11 per cent.

■ STRATEGIC METALS STOCKPILING EXTENDED TO JULY 1
WASHINGTON—Stockpiling of strategic metals and minerals has been extended from Apr. 1, to July 1, by War Assets Administration.

■ AMERICAN STEEL FOUNDRIES BUYS GOVERNMENT FOUNDRY
CHICAGO—American Steel Foundries has purchased from the government the steel foundry of the Quad-City tank arsenal, Bettendorf, Iowa, for $1,290,000. Steel castings for railroads and other industries will be made in the plant.

■ MAKES FIRST ALL-WELDED STEEL ALLOY COAL CAR
ROANOKE, VA.— First all-welded steel alloy coal car made its initial appearance here last week, following completion in the shops of Virginia Bridge Co.

■ SMALL MILLS SEEKING LOWELLVILLE WORKS
PITTSBURGH—Several small nonintegrated sheet steel producers are reported negotiating purchase of the Lowellville, O., works of Sharon Steel Corp. This works supplied Sharon Steel with semifinished material up to the time Sharon acquired the Farrell Works of the Carnegie-Illinois Steel Corp. Acquisition by the small mills would help solve their critical semifinished steel supply problem.

HOWARD COONLEY

As chairman of the industry advisory council to the Federal Specifications Board, Mr. Coonley will serve as liaison between industry and the board

CLIFTON E. MACK

Director of the Treasury Department's Procurement Division, Mr. Mack has the top responsibility for activities of the Federal Specifications Board

WILLIS S. MacLEOD

Acting deputy director, standards branch, Treasury Procurement Division, Mr. MacLeod is responsible for the work of the 72 technical committees serving the board

Federal Purchasing Specifications Scheduled for Review and Revision; Industry Co-operation Enlisted

Five-year program expected to result in economies and increased efficiency in government buying. May result in indirect improvement in private industry purchasing methods. Total of 9473 specifications to undergo scrutiny

"FIVE-YEAR PLAN" to review, revise and rewrite the purchasing specifications used by government procurement agencies has just been launched by the Federal Specifications Board.

Scope of the task is indicated by the fact the United States government is the largest purchaser in the world. A total of 9473 specifications are used, including 5600 for the Army, 1495 for the Navy, 232 for the Army and Navy jointly, 396 for the Treasury Procurement Division and 1750 which are used by all federal agencies.

Government officials believe the review task, to be undertaken in co-operation with industry representatives, will result in increased efficiency and will be helpful not only to the government buying agencies but may also improve the purchasing methods of private business.

One of the notable features of the new program is the extent to which industry will be called on to co-operate. These contacts will be under the aegis of an Industry Advisory Council of which Howard Coonley is chairman. Members of the council will include representatives of specifications writing associations, and also individual men of industry. The group is to be kept as small and compact as possible.

In addition to serving as chairman of the council, Mr. Coonley a director of the Walworth Co., will advise on specifications covering valves and fittings. Other individual members are Thomas Spooner, manager of the Engineering Laboratories and Standards departments, Westinghouse Electric Corp.; Vincent dePaul Goubeau, general purchasing agent and director of materials, Radio Corp. of America; and Harold S. Osborne, chief engineer, American Telephone & Telegraph Co.

Other members of the council are C. L. Warwick, American Society for Testing Materials; P. G. Agnew, American Standards Association; Clarence L. Collens, National Electrical Manufacturers Association and American Institute of Electrical Engineers; Warren N. Watson, Manufacturing Chemists Association. The council membership also will include representatives of the American Society of Mechanical Engineers and the Society of Automotive Engineers as soon as these have been designated.

The industry men comprising the membership of the council will be called into consultation, as needed, with the Federal Specifications Board's technical committees on matters of policy, procedure, commercial practices and industry participation. They will assist in obtaining technical participation in the work of the board's technical committees, of which there are 72. They are composed of experienced men from the various government procurement agencies, and are charged with the spade work in rewriting existing specifications that need to be brought up-to-date, and with writing new specifications to cover new or greatly improved products of industry.

Difficult Tasks Lie Ahead

Many of these technical committees have difficult tasks ahead of them, according to Willis S. MacLeod, Treasury Procurement Division official to whom these committes report in his capacity of vice chairman of the board.

"The Packaging Committee has a lot of problems," Mr. McLeod told STEEL. "A lot has been learned about packaging and we should have purchasing specifications which will give the government the benefit of that progress. The Paint Committee has a big job— and one of the objectives in this field is to cover a greater variety of corrosion resistant paints. The Plastics and Textiles Committees not only will have to cover the field of specifications thoroughly, but will have to develop tests by which goods purchased under the specifications may be adequately checked.

"Our Electrical Supplies Committee has some 150 items pending on its active agenda. Other committees with active programs have to do with synthetic rubber, frozen foods, office machinery, paper, fuels and lubricants, wearing apparel, furniture. We are about to establish a Committee on Safety whose concern it will be to make sure that all equipment

purchased by the government is provided with necessary protections against safety hazards.

"One of our prime aims," continued Mr. MacLeod, "is to improve quality where war-enforced compromises occurred. For example, the quality of paper was degraded during the war because of the pulp and labor shortages, and we propose to restore reasonable standards consistent with use requirements. Another aim will be to direct purchases with a view to promoting efficiency; we have under way a program intended to reduce the types and variety of office machinery purchased by the government.

"This work on specifications certainly pays off in making the taxpayers' dollars go farther, because of the uniformity in product and the larger volume purchases which result," said Mr. MacLeod. "We used to pay 36.7 cents per square foot for venetian blinds; under the specifications technique the price has been reduced to 20 cents, and the saving that results from Treasury Procurement purchases alone comes to $40,000 a year. We paid $1.10 a quart for indelible ink but under our new specification we expect to pay only 35 cents. Under carefully written specifications we are saving about 75 per cent on our purchases of spar varnish. These are just a few random illustrations—altogether our specifications save the government many millions annually."

Clifton E. Mack, director of the Treasury Procurement Division, emphasizes the importance of the federal specifications work to the government procurement job. He believes much good can come from enlistment of industry cooperation in revising and writing government specifications, not only to the government but also to industry. The setting up of proper specifications for the government, he believes, can be helpful in the long run in improving purchasing methods in private business.

The Federal Specifications Board dates back to October of 1921 when it was organized by the late Charles G. Dawes, then director of the Bureau of the Budget. In 1933 the board was succeeded by the Federal Specifications Executive Committee under the chairmanship of Dr. Lyman J. Briggs. In August of 1945 the committee was reorganized with specific operating assignments on management of the program, thus re-establishing the Federal Specifications Board.

The board reports to Mr. Mack, who carries the responsibility for its policies and work in general. Chairman of the board is Dr. Edward U. Condon, who last year succeeded Dr. Lyman J. Briggs both in this capacity and as director of the National Bureau of Standards. Mr. MacLeod is executive vice chairman

One of the important men in the setup is Edward L. Hollady, Office of the Chief of Ordnance, War Department, who is chairman of the Metals Committee of the Federal Specifications Board. This committee has 22 subcommittees assigned to various metals specifications. One of the prime tasks will be to set up specifications for magnesium and its alloys. Another will be to determine the extent to which the government procurement agencies will continue to specify wartime National Emergency steels.

Revision in Iron and Steel Prices Clarified by OPA

Several important provisions of the ceiling price increases in iron and steel products granted producers on Mar. 1, were clarified last week by the Office of Price Administration. Clarification was made in amendment 16 to revised price schedule No. 6.

Through a number of changes, effective Apr. 1, OPA made clear the following procedures:

1. Maximum prices of secondary quality products should be computed by taking a percentage (listed in revised schedule 6) of the base price of the corresponding prime quality product, after adding the price increase to the base price of the latter.

2. Ceiling price increases on iron and steel products granted Mar. 1, apply to products made of iron, other than wrought iron, as well as those made from carbon steel.

3. The increase of 35 cents per 100 pounds granted for galvanized sheet applies also to galvannealed and zinc coated specialty sheets.

4. The provision permitting producers of rails to price them on a net ton rather than a gross ton basis is amplified to provide that in making the conversion base prices should be cut the appropriate amount to reflect the difference in weight while extras, now listed in gross tons, may be added for net tons without any reduction.

Railroad Specialties Price Regulation Amended

All railroad parts and assemblies, 90 per cent of the shipping weight of which is steel castings, were brought on April 1 under the higher ceiling prices covering railroad specialties in price schedule 410, the Office of Price Administration announced last week.

Bolt, Nut and Screw Prices Increased 7%

Advance in producers' ceilings, effective Apr. 1, covers higher raw material and labor costs

PRODUCERS' ceiling prices for bolts, nuts, screws and rivets were increased 7 per cent, effective Apr. 1, the Office of Price Administration announced last week.

Resellers are not authorized now to pass along the price increases, the agency said. However, OPA is conducting a study to determine the amount of the increase, if any, that resellers may be permitted to add to their ceiling prices.

Industry-wide action was made to enable producers to earn the same rate of return during the next 12 months that the industry received during the base period, 1936-1939, OPA said.

OPA's action will keep these standardized products on a uniform pricing basis. If larger increases had been given for the products of producers who have raised wages, they would have caused two levels of prices for the same items and resultant serious dislocations.

Brass Mill Product Prices Advanced 1.5 Cents a Pound

Ceiling prices on brass mill products were increased an average of 1.5 cents a pound last week by the Office of Price Administration. The increases in base prices and extras were made effective Apr. 1. Further adjustments may be necessary later if pending wage demands are granted.

Brass mill products covered by the order may be sold at the March, 1942, base price plus the following additions in cents per pound:

Copper Products: Sheets and plates, 1.21; anodes, strips and rolls, 1.20; rods, including bus and commutator, 1.23; seamless tubes, other than water tubes, 1.05; angles, channels, moldings and open seam tubes, 1.20; extruded shapes, 1.23.

Alloy Products: Nickel alloys, all product forms, 2.12; phosphor bronze, all product forms, 2.52; sheets, strips, plates and rolls, 1.33; rods, 1.03; wire, 1.32; seamless tubes, other than tubes for plumbing, 1.32; angles, channels, moldings, and open seam tubes, 1.33; extruded shapes, 1.03.

Baltimore Industry Pinched for Steel

BALTIMORE district steel operations, having just reached a higher level than prevailed before the steel strike, now face the threat of curtailment again as the result of suspensions at the soft coal mines.

This prospect arises at a time when the district steel consumers generally are having by far the greatest difficulty ever experienced in peacetime in obtaining tonnage—not only in light flat-rolled products, but in bars, shapes, wire and even to a considerable extent in plates. Mills are far behind on schedules and jobbers' stocks are as unbalanced as at any time on record.

Some warehouses are swept virtually clean of sheets and strip and the most popular sizes of hot bars and shapes. In fact, one distributor declares facetiously, although apparently with cause, that he would like to rent his warehouse out as a dance hall, as depletion of stocks has left floor space wide open.

Contributing to present pressure for steel is adjustment of labor disputes at various metalworking plants, although generally and apart from the steel strike the situation in the Baltimore area probably has been less disturbed so far this year than most other industrial districts. Among strikes still in effect are those at the plants of Westinghouse Electric Corp. and the Maryland Bolt & Nut Co.

Meanwhile substantial expansion in steel facilities in this district is under way, although advancement on certain projects will depend on final interpretation of the recent Civilian Production Administration curb on various types of construction with a view to facilitating the veterans' housing program. Question arises, for example, con-

Mills face new curtailment due to coal strike, just as operations surpass pre-steel strike level. Effect of construction restrictions on steel expansion programs uncertain

cerning the proposed 66-inch continuous sheet and strip mill at Bethlehem Steel Co.'s Sparrows Point plant, whether work has proceeded far enough to exempt the project from the ruling and, if it hasn't, whether the project wouldn't be given approval because of its importance in providing jobs and providing capacity for badly needed flat tonnage.

Work is well along on a 56-inch cold reducing sheet and tin mill, although operations originally scheduled to begin in May are not likely to get under way before the fourth quarter. Delay of control equipment, as a result of strikes in the electrical industry, is an important factor in the delay. Also under construction at Sparrows Point is an addition to the present 42-inch continuous cold mill.

Rustless Iron & Steel Corp. has a substantial expansion program in progress. However, the extent to which this will be carried out this year depends on interpretation of the construction order.

Steel fabricators in the Baltimore area are choosing carefully, primarily because of uncertainty as to structural shipments and because of continued shortage of draftsmen, although another factor is the question of priority for various types of building jobs, because of the emphasis now being placed on housing. In this district recently one job for the Navy involving 300 tons, has been canceled, as not being important enough under present conditions.

Shipyard steel requirements, outstanding in this district during the war, have naturally fallen off sharply with the decline in ship construction. However, there has been a fairly substantial amount of ship repair and reconversion work and only recently the reconversion work has been stepped up appreciably with the likelihood that this will be an important factor for some time. This follows the recent decision of the Maritime Commission to return vessels, which were taken over from their owners during the war emergency, on a much more rapid basis than had been contemplated, earlier in the year.

Additional Industries Barred From Operating in Germany

Fourteen specific types of industries in addition to primary war industries have been prohibited in postwar Germany under the terms of a new Allied law.

These include synthetic gasoline and oil, rubber, ammonia, ball bearings, heavy machine tools and tractors, primary aluminum, magnesium, beryllium and vanadium from Thomas slags, radioactive materials, hydrogen peroxide above 50 per cent, specific war chemicals and gases and radio transmitting equipment.

All plants turning out direct war materials such as arms, ammunition, all types of aircraft and seagoing ships, were designated for abolition by the Potsdam declaration.

Earlier the Allied authorities announced the German steel industry would be restricted to 7,500,000 tons

February Pig Iron Output Lowest Since November, 1934

American Iron & Steel Institute

Blast Furnace Capacity and Production—Net Tons

	Number of companies	Annual blast furnace capacity	Production							
			Pig Iron		Ferro manganese and spiegel		Total			
			Current month	Year to date	Current Month	Year to date	Current month	Year to date	Percent of capacity	
									Current month	Year to date
Distribution by Districts:										
Eastern	12	12,988,970	164,952	600,677	2,800	13,735	167,752	614,412	16.8	29.3
Pittsburgh-Youngstown	15	25,939,940	406,688	1,411,791	-	4,271	406,688	1,416,062	20.4	33.8
Cleveland-Detroit	7	6,557,500	130,460	423,318	-	-	130,460	423,318	25.9	39.9
Chicago	7	14,093,510	280,144	868,783	-	-	280,144	868,783	25.9	38.1
Southern	9	4,924,670	119,451	338,120	2,706	7,079	122,157	345,199	32.3	43.4
Western	5	2,836,000	40,363	124,342	-	-	40,363	124,342	18.6	27.1
Total	36	67,340,590	1,142,058	3,767,031	5,506	25,085	1,147,564	3,792,116	22.2	34.8

of capacity and an annual production of 5,800,000 tons.

For nonferrous metals the annual production has been fixed as follows: Copper, 292,000 tons; zinc, 1000 tons; lead, 223,000 tons; tin, 16,000 tons; and nickel, 9500 tons.

Basic chemicals are reduced to 40 per cent of 1936 production and other chemicals are cut to 70 per cent of 1936 volume. Dyestuffs, pharmaceuticals and synthetic fibers will be permitted up to 80 per cent of 1936 output.

Machine tools because of their strategic importance to war are restricted to 11.4 per cent of 1938 productive capacity and are further restricted on types that may be built. Heavy engineering trades may operate only at 31 per cent of 1938 volume.

Automobile and truck production is limited to 40,000 units of each annually. Four thousand light road tractors a year will be permitted. Provision also is made for the manufacture of 10,000 low-powered motorcycles.

Under the four-power regulation, postwar Germany will concentrate on agriculture, coal mining, potash production, building construction and building materials, exclusive of cement. Other major industries will be furniture and woodworking, flat glass, bottles and domestic glass, ceramics and bicycles.

Acid Open Hearth Group Holds Pittsburgh Meeting

Status of the research program of the Acid Open Hearth Research Association was outlined by Dr. G. R. Fitterer, University of Pittsburgh, at the organization's recent technical meeting held at the Roosevelt Hotel, Pittsburgh. Dr. Fitterer stated that the work on low carbon heats has been completed and that the research staff is now engaged in a new high carbon investigation.

B. B. Rosenbaum presented a summary of a recently completed investigation in which the working practice of 34 casting grade heats within the association were correlated with physical properties. Static properties were shown to be primarily associated with chemical analysis and heat treatment rather than with the method of making the heat. However, dynamic properties, as indicated by the notched bar impact test, varied widely for a given chemical composition. The possible effects of variations in furnace practice upon impact strength was discussed and certain interesting relations were illustrated.

J. W. Linhart described a series of six consecutive high carbon heats which constitute the start of a new high carbon research program.

Canadian Control Board Permits $5 Per Ton Steel Price Advance

Increase made effective Apr. 1 and adjustment is extended to manufacturers using steel except in instances where specific industry investigations are under way to determine extent of relief needed

TORONTO

CANADIAN iron and steel prices have been increased $5 per ton, Donald Gordon, chairman, Wartime Prices & Trade Board, announced last week. The advance became effective April 1, but does not eliminate price ceiling on steel and manufacturers thereof.

Certain products such as farm machinery will not be affected by the advance because they are under specific examination to determine possible need for overall adjustments.

Under the adjustment, manufacturers are allowed to increase their maximum selling prices by the amount of the increase in the steel used, plus 25 per cent to offset increased selling commissions.

Where adequate relief already has been provided, where the cost increase was relatively small, or where the Prices Board considered further investigation of a particular field necessary, increases are not allowed at the manufacturing end at present.

The price increase affects all steel materials, finished and semifinished including pig iron, ingots, sheets, plate, etc.

Some 14,000 tons of steel rails are to be shipped to China by War Assets Corp. under an arrangement with the British Government, the Canadian Export Board, and the United Nations Relief & Rehabilitation Administation. The rails rolled at the Sydney, N. S., steel plant by Dominion Steel & Coal Corp. were intended for British use and are of lighter weight than required under Canadian railway standards. The selling price to China was $741,600.

Fairchild Aircraft Ltd., Montreal, which discontinued all aircraft production at the end of the war, plans to resume output of commercial aircraft at an early date.

Canadian Car & Foundry Co. Ltd., Montreal, has acquired all assets of the Noorduyn Norseman Aircraft Ltd., including all rights for the manufacture and sale of the Norseman aircraft.

Canadian Pacific Railway will spend approximately $15,750,000 on its lines from Fort William east to the Atlantic Coast. The proposed program will involve the laying of 365 miles of rails, construction of bridges, improvement of roadbeds, erection of stations, etc.

Calendar of Meetings . . .

Apr. 8-12, American Society of Tool Engineers: Annual meeting and exposition, Public Auditorium, Cleveland. H. E. Conrad, Penobscot Bldg., Detroit, executive secretary.

Apr. 9-10, Science and Engineering Forum: Machine Tool Electrification Forum, sponsored by Westinghouse Electric Corp., to be held at Hotel William Penn, Pittsburgh.

Apr. 10-13, Electrochemical Society Inc.: Spring congress, Tutwiler Hotel, Birmingham. Colin G. Fink, 3000 Broadway, New York 27, secretary.

Apr. 15-18, National Warm Air Heating & Air Conditioning Association: Warm air heating conference, College of Applied Science of Syracuse University, Syracuse, N. Y. George Boeddener, 145 Public Square, Cleveland, managing director.

Apr. 17-19, American Society of Civil Engineers: Annual spring meeting, Bellevue Stratford Hotel, Philadelphia. Association headquarters are at 33 West 39th St., New York 18.

Apr. 22-24, American Management Association: Conference, Hotel Pennsylvania, New York. Association headquarters are at 330 West 42nd St., New York 18.

Apr. 22-27, Society of the Plastics Industry: National Plastics Exposition, Grand Central Palace, New York. Association headquarters are at 295 Madison Ave., New York 17.

Apr. 25-26, American Institute of Mining & Metallurgical Engineers: Twenty-ninth annual open-hearth steel and blast furnace and raw materials conferences, Chicago. A. B. Parsons, 29 West 39th St., New York 18, secretary.

Apr. 26-30, International Lighting Exposition: Stevens Hotel, Chicago.

Apr. 28-May 2, American Ceramic Society Inc: Forty-eighth annual meeting, Hotel Statler, Buffalo. Ross C. Purdy, 2525 North High St., Columbus 2, O., general secretary.

Apr. 30-May 2, Chamber of Commerce of the United States: Annual meeting, Atlantic City.

May 1-2, Iron & Steel Institute: Annual general meeting to be held at the institute's headquarters at 4, Grosvenor Gardens, London, S. W. 1, England.

May 6-7, Association of Iron & Steel Engineers: Spring conference sponsored by the rolling mill committee, Congress Hotel, Chicago. Association headquarters are at 1010 Empire Bldg., Pittsburgh 22.

May 6-8, Triple Mill Supply Convention: Participating associations are: Southern Supply & Machinery Distributors Association, National Supply & Machinery Distributors Association and American Supply and Machinery Manufacturers Association. Convention will be held in Atlantic City, N. J.

May 6-10, American Foundrymen's Association: Fiftieth annual Foundry Congress and Show, Public Auditorium, Cleveland. W. W. Maloney, 222 West Adams St., Chicago, secretary.

Fear Building Curb Will Hold Up Industrial Expansion on Coast

Contractors hesitate to calculate full effects of government curtailment order on the San Francisco area's projected $100 million program of commercial and industrial construction but believe it will have serious repercussions

SAN FRANCISCO

ESTIMATED $100 million of new commercial and industrial building in San Francisco may be affected by the government's recent ban on nonessential commercial and industrial construction.

Contractors hesitate to calculate the full effects of the order, but they believe it may have serious repercussions if allowed to remain in effect too long.

When the regulation was issued, work had been started on only a few new structures, with most of them still in the planning stage or on drawing boards.

Some builders point out materials required for heavy construction differ entirely from the types needed in home building, and unless the government is inflexible in its ruling it is believed this difference in requirements will allow at least a start on a number of projects which otherwise might be barred.

Several contractors point out the order may result in unemployment of thousands of skilled construction workers.

Meanwhile, planning for plant expansions continues. Industrial projects reported for February totaled 63 new plants and 51 expansions of existing plants, with aggregate value of $10,300,000. February's total brings that for the first two months of 1946 in northern California to 212 projects with construction value of $18,647,800.

With approach of May 1, deadline for bidding on the Geneva steel plant in Utah, there has been an increased flurry of statements by public officials, business organizations and government authorities regarding the future of this mill.

Gov. H. B. Maw of Utah, said "recent developments practically assure full-scale operation of Geneva." However, he declined to comment on the source of his information nor would he say whether the certainty of the plant's operation had come from U. S. Steel Corp., Colorado Fuel & Iron Corp., the Kaiser interests, or a fourth steel company, all of which have been mentioned as bidders.

Meantime, San Francisco Chamber of Commerce directors have gone on record as favoring earliest possible sale of the Geneva mill.

OPA Ceilings Hit by Small Manufacturers at Hearing

LOS ANGELES

Small manufacturers of articles for use in home construction cannot hope to compete with mass producers of these same articles under present OPA pricing setups, Louis M. Dreves, chief of the Southern California region of the Civilian Production Authority, told a committee of state legislators in Los Angeles last week.

Prior to his testimony, two officials of Los Angeles plumbing concerns testified home hardware could not be made and sold under present OPA ceilings.

Despite the best efforts of governmental expediting agencies and private contractors not more than 25 actual dwellings for veterans have been constructed since the war's end. Of privately financed homes, some 15,000 now stand in various stages short of completion in the Los Angeles area.

A sidelight of the testimony given by one fixture manufacturer gave added emphasis to the view of many industrialists that the shortage of skilled labor

BOUGHT BY NASH: Plant operated during the war by North American Aviation Inc. at El Segundo, Calif., in the Los Angeles area, has been purchased by Nash-Kelvinator Corp., Detroit, for assembly of Nash automobiles and trucks and Kelvinator appliances. Built in 1944, the 475,000 sq ft facility is at the south boundary of Los Angeles municipal airport. Within 90 days it will be cleared of government equipment and surplus materials, re-equipped by the new owner and placed in operation probably by late fall, with 2400 employed

which besets southern California will not be mitigated until housing in quantity is produced.

Total employment in all southern California factories stands at approximately 326,000. Population continues to climb in the state's 14 southern counties, it was indicated by a check taken over the last month showing that nearly 4500 persons entered the area in cars with out-of-state licenses.

In general, business activities during February continued at a high level. In the steel producing industry, mills of the Kaiser Co., Bethlehem Steel Co. and Columbia Steel Co. are on an average aggregate production percentage of nearly 90, with no employment problems in any of the mills.

Power Showdown Expected In State of Washington

SEATTLE

Public and private power interests are lining up their forces for a showdown in Washington state where the former are determined to take over all private power facilities through local Public Utility District units. Suit has been filed to determine the legality of a proposed $135 million bond issue to finance purchase of the holdings of the Puget Sound Power & Light Co. These cover a large part of western Washington and include the Rock Island power plant on the Columbia river.

A consolidation of utility districts is pushing the matter. Guy C. Meyers, of New York, has been promoting the project for some time. The amount of the proposed bond issue is not the selling price as the present owners have refused to indicate their ideas or to negotiate until the districts make a showing of their financial responsibility.

Gov. Mon C. Wallgren is asking that state regulations of P. U. D.'s be invoked so that the state's interests may be protected.

Another problem is the position of the municipal plants in Seattle and Tacoma. The filing of the current suit is the culmination of years of effort by public ownership advocates to control power.

Officials of the state Unemployment Division report that during the week ending Mar. 22, unemployment dropped 5000. This is attributed in part to the fact some claimants have exhausted their benefit rights. Tacoma and Vancouver jobless have recently increased due to layoffs at the shipyards.

Federal Works Agency officials report a large backlog of projected public works in this area and Alaska. This totals $88 million of which $68 million is planned with federal aid.

GOVERNMENT CONTROL DIGEST

Weekly summaries of orders and regulations issued by reconversion agencies. Symbols refer to designations of the orders and official releases. Official texts may be obtained from the respective agencies

CIVILIAN PRODUCTION ADMINISTRATION

Construction: CPA transfers to National Housing Agency authority to approve applications for all housing construction. NHA may grant appeals and give exceptions to the provisions of priorities regulation 33 and approve applications falling within the terms of that order. Approval on form CPA-4386 for housing gives authorization to proceed without further permit under the Veterans Housing Program order No. 1. (CPA directive 42)

Housing: Assignment of "CC" preference ratings in non-housing field curtailed. Ratings for procurement of critical building materials, including cast iron radiation, will be issued only to complete construction which is required to increase production of items designated by CPA to be critical from a national standpoint, or to complete construction which is necessary to public health or safety. (PR-28; CPA-274)

Coke: Industrial users, including utilities, of coke restricted to a 20-day supply, effective April 2. (PR-32; CPA-273)

Industrial Fabrics: Producers of specified industrial-type cotton fabrics must set aside a proportion of second-quarter output to meet vital industrial and agricultural requirements. Set-asides range from 7½ per cent for certain class B sheetings to 100 per cent for chafer fabrics, hose and belting duck, and filter duck. (M-317; CPA-268)

OFFICE OF ECONOMIC STABILIZATION

Metal Subsidies: Premium Price Plan now provides for maximum payment of 10 cents a pound in a Special Copper Class; 5½ cents for "B" lead quotas. (OES-34)

OFFICE OF PRICE ADMINISTRATION

Cast Iron Radiation: Cast iron radiation prices increased, effective Mar. 28, 28, 7 cents a sq ft, equivalent after discounts to distributors to net increase of 5.65 cents a sq ft. (MPR-272; OPA-6348)

Cast Iron Rolls: Adjustable pricing agreements allowed under which cast iron rolls may be sold at prices that may be adjusted upward to higher ceiling approved later. Survey being made which may result in approval of an industry-wide price increase. (MPR-136; OPA-T-4319)

Solid Fuels: Temporary increase of 10 cents a ton in retail ceiling prices of coal, coke and other solid fuels on delivered sales to consumers, made effective for the period from Jan. 2 until Apr. 30, continued in effect indefinitely. The 10-cent addition extended to retail sales of less than carlot when made to consumers fob dealer's yard. (MPR-122; OPA-6349)

Jacks, Mechanical: Ceiling prices for heavy-duty mechanical jacks increased 15.8 per cent, effective Mar. 27. (MPR-136; OPA-T-4316)

Motors, Outboard: Ceiling prices for outboard motors set at price lists in effect prior to Mar. 31, 1942. For types of motors, electric or gasoline, not included in the manufacturer's price list, ceilings will be determined either by formula or by application to OPA. (MPR-188; OPA-T-4311)

Railroad Specialties: All railroad parts and assemblies, 90 per cent of shipping weight of which is steel castings, are now priced under schedule 41, effective Apr. 1. This results in an increase in Oct. 1, 1941, prices of 15.5 per cent. Products affected include underframes, underframe parts and truck parts for locomotives, tenders and cars; locomotive wheel casters not otherwise covered by RPS-41; ash pans, assembled; pilots, assembled; hopper door frames, locks, hinges and drop-end locks. Pattern costs may be added to railroad specialties prices in certain cases. Base date for determining maximum prices of miscellaneous types is changed from July 15, 1941, to the Oct. 1-15, 1941, period. (RPS-41; OPA-T-4332)

Washing Machines, Ironers: Reconverting manufacturers of household washing machines and ironers increase base ceiling prices by 1.8 per cent, effective Apr. 2. (MPR-86; OPA-T-4340)

Building Wire: Fixed ceiling prices established for rubber braid building wires, effective Apr. 8. (MPR-82; OPA-6350)

Heating Boilers: Manufacturers' prices for cast-iron gas-burning heating boilers increased 10.5 per cent, effective Apr. 2. (MPR-591; OPA-6368)

Bolts and Nuts: Ceiling prices for bolts, nuts, screws and rivets increased 7 per cent, effective April 1. Resellers not permitted to pass along the increases. (MPR-147; OPA-T-4329)

Copper and Brass Products: Brass mill product prices increased an average of 1.5 cents a pound, effective Apr. 1. Ceilings are now March, 1942, base prices plus the following in cents a pound: Copper: Sheets and plates, 1.21; anodes, 1.20; strips and rolls, 1.20; rods, including bus and commutator, 1.23; seamless tubes, other than water tubes, 1.05; angles, channels, moldings and open seam tubes, 1.20; and extruded shapes, 1.23.

Alloy Products: Lithalloys, all product forms, 2.12; phosphor bronze, all product forms, 2.52; sheets and plates, 1.33; strips and rolls, 1.33; rods, 1.03; wire, 1.32; seamless tubes, other than tubes for plumbing, 1.32; angles, channels, moldings and open seam tubes, 1.33; and extruded shapes, 1.03. (Supp. Reg. 14 to GMPR)

WAR ASSETS ADMINISTRATION

Aluminum Scrap: Minimum price for class D aluminum scrap when sold by WAA reduced 4 cents to 2½ cents a pound. Aircooled engine cylinder heads with steel cylinder barrels attached, originally included in class D, removed and placed in class F, at minimum of 2 cents a pound. Minimum price of ½-cent a pound less than the established price established where the lot available for sale at any one place is less than 30,000 pounds.

Minimum prices for various grades of aluminum scrap are as follows: Class A, pig or ingot resulting from melting of obsolete or wrecked aircraft, 6 cents; class B, segregated solids consisting of only one alloy, pure cable (clean and free of iron), and foil (clean and new), 6 cents; class C, mixed solids, obsolete castings and forgings, obsolete pistons, and any other clean solids free of all metal other than aluminum, 5 cents; class D, solids mixed with foreign materials, 2½ cents; class E, prepared aircraft scrap (not including engines or engine parts) recovered from wrecked, crashed, obsolete, or uncompleted airframes cut or sheared into pieces about 48 in. x 60 in. x 24 in. or less and shipped in 30,000-pound minimum cars, 2½ cents; class F, air cooled engine cylinder heads with steel cylinder barrel attached, 2 cents; class G, wrecked, crashed, obsolete or uncompleted airframes, or major structural segments of such airframes to be scrapped (without preparation of any kind), 1¼ cents. (SPA Reg. 12; WAA-17)

OFFICE OF INTERNATIONAL TRADE

Exports: Special export licensing procedure for exports to countries which require import permits discontinued for all commodities except cotton textiles. (No. T-10)

Social Security Undergoing Study In House Ways and Means Group

Fundamental revision of program likely to be offered in Congress after summer recess. Committee's technical staff prepares 742-page report on basic issues which may be used in formulating new legislation

A LONG-TERM study of the whole field of social security, the outcome of which will have a profound bearing on life in America for years to come, is now in process by the House Ways and Means Committee.

The study dates back to March, 1945, when some 80 bills concerning social security were introduced in the House. These proposed various changes in the program of old-age and survivors' insurance, unemployment compensation, old age assistance, aid to dependent children, and aid to the blind.

Among these the outstanding proposal was the Murray-Wagner-Dingell bill which generally was regarded as acceptable in its aim of extending social security coverage to state and municipal employees, to agricultural and maritime and domestic workers, but which was widely opposed for its scheme of bringing "socialized medicine" into our life.

In the Senate the Murray-Wagner-Dingell bill was pigeonholed in the Finance Committee. But in the House the bill was taken seriously; there it was split into two parts—the Ways and Means Committee retaining that portion of the bill broadening the existing social security system, with the features providing for federal control of health and medicine incorporated in a new bill that was referred to the House Committee on Interstate & Foreign Commerce.

Technical Report Issued

The more these committees wrestled with this proposed legislation, the more grew their confusion over suggested changes in financial arrangements, requirements for receipt of benefits, computation of benefit amounts, the extent of changes in the old-age and survivors contribution rates, etc. But as the committee members gave their attention to the subject matter, they came gradually to recognize that they had before them one of the nation's basically important questions. Eventually they came to the conclusion that the first thing to be done was to conduct a study of all facts pertinent to social security. The upshot was authorization of a thorough study. To accomplish this, a technical staff was created. Early this year this staff came up with a comprehensive report. Entitled *Issues in Social Security*, it is a 742-page book. The report is of technical character and contains 231 tables setting forth pertinent data.

"We are studying the entire field of social security from the ground up," Rep. Harold Knutson (Rep., Minn.), ranking minority member of the Ways and Means Committee, told STEEL. "We are not considering any definite bills in our executive meetings at this time. We are basing our study on the *Issues in Social Security* report. Our approach is fundamental; we want to prepare legislation that will cover the subject comprehensively."

Mr. Knutson was not sure just when the bill contemplated by the Ways and Means Committee will be ready for introduction in the House. He considered it likely that the bill will be ready in the fall, rather than before the summer recess, as a vast amount of ground remains to be covered.

The committee, in inviting witnesses to present recommendations at its hearings, has gone over the field with a fine-tooth comb. Perhaps the only criticism that might be made of its calender of witnesses is that more individuals might be called in from industry—this because the cost of social security comes in the main out of industrial earnings. The number of labor union representatives appearing before the committee is noteworthy by contrast.

By way of illustration recent witnesses included Arthur J. Altmeyer, chairman, Social Security Board; R. T. Compton, National Association of Manufacturers; and spokesmen for the Veterans of Foreign Wars, General Welfare Federation, American Legion, National Catholic Welfare Conference, American Association of Social Workers, State Teachers Retirement Systems, American Hospital Association, National Council of Negro Women, American Protestant Hospital Association.

The book *Issues in Social Security* may be had from the Superintendent of Documents, Government Printing Office, Washington 25, at $1.25 per copy. It has in it all basic data essential for the formulation of opinion on the subject.

BORON DETECTORS

Two spectrographic methods for quick routine determination of boron in steel have been developed at the Bureau of Standards. The first method detects down to 0.0006 per cent boron, with average deviation of plus or minus 4 per cent. The second is adaptable to massive steel pieces and is equally sensitive. Both methods permit routine determinations covering the usual range of boron concentrates in less than 20 minutes per sample.

The bureau reported a third method, which will make determinations down to 0.0001 per cent of boron, or 1 part in 1 million of the steel sample.

Vermilya Appointed To Post In Housing Administration

Howard P. Vermilya, research director, John B. Pierce Foundation, has been appointed consultant on technical problems on the staff of Wilson W. Wyatt, national housing expediter and administrator of the National Housing Agency. Before going with the Pierce Foundation in 1944, Mr. Vermilya had been with the Federal Housing Administration since its establishment in 1934 as assistant director, Technical Division.

Anti-Cartel Provisions Of Patent Bill Approved

The House Committee on Patents has favorably reported to the House the Boykin Bill, H. R. 3756, to require the registration with the Patent Office of all international patent agreements involving a United States party, and recording all domestic licenses and patent agreements involving restrictions as to price, quantity of production, etc., generally known as the "anti-cartel" provision of the bill.

Prohibits Export of Cars, Trucks in Relief Shipments

While no weight or dollar limitation has been placed on relief shipments by private agencies registered with the War Relief Control Board, certain items may not be exported, it was pointed out recently by the Office of International Trade.

These forbidden exports under the head of relief shipments include, besides scarce food, such goods as passenger cars, trucks, storage batteries, etc. Ambulances may be exported, however.

Six members of the faculty of the "Conciliation College" of the U. S. Conciliation Service. Left to right are W. Ellison Chalmers, Charles Ray, E. P. Marsh, Edgar L. Warren, James J. Spillane and Anne Weinstock. Mr. Warren is director of the service, Mr. Chalmers is chief of its Division of Procedures & Training, Mr. Marsh is regional director at San Francisco and Mr. Spillane at Chicago, and Mr. Ray and Miss Weinstock are ace conciliators

Conciliation Service Undergoes Overhauling

Administration strengthening service, now only federal agency charged with maintenance of industrial peace. Training school established to teach conciliators latest methods and techniques for settling disputes

WITH news of labor disputes, and of labor activities generally, commanding more front-page space in recent months than at any previous time in history, and with indications that such news will break into the headlines at frequent intervals, one of the significant developments now under way in Washington is a thorough overhauling of the United States Conciliation Service.

This movement to build up the Conciliation Service grows primarily out of the general conviction in the Truman administration that the government, if only to protect the public against preventable stoppages in production, must be prepared at all times to step into dispute cases in the role of conciliator. It stems also from the fact that the United States Conciliation Service now is the sole federal agency (aside from the National Mediation Board, which has jurisdiction in the field of railroad labor disputes) responsible for maintenance of industrial peace and that, therefore, the Conciliation Service must have the facilities to do the job.

During the war, in addition to the National War Labor Board, divisions of the War Production Board, the War Manpower Commission, the Army, the Navy, and the other procurement agencies all were engaged in the field of labor relations. Today this function of every one of these agencies has passed out of existence.

The movement to improve the Conciliation Service stems also from recommendations of both management and labor. The President's Labor-Management Conference last November, realizing that the Conciliation Service is now the only agency of this type to serve industry generally, devoted much time to considering ways and means of strengthening this service. Conference resolutions called for: 1—An improvement and strengthening in the conciliation service generally; 2—an improvement and strengthening in the arbitration service; 3—closer contacts of conciliators with labor and management in the country's industrial areas; and 4—appointment of more conciliators with an engineering background so as to provide for a proper disposition of questions involving job evaluation and incentive pay.

Labor-Management Committee

An important recommendation of the President's Labor-Management Conference under the first head—that of improving and strengthening the Conciliation Service—was that a Labor-Management Committee be appointed to work with the service.

This committee was appointed last January by Secretary of Labor Schwellenbach and meets regularly once a month with Conciliation Director Edgar L. Warren. It reviews policies, and advises Mr. Warren when it thinks they should be revised.

One of the first acts of this committee was to investigate charges that the conciliation commissioners are biased on the side of labor. The committee found that about 45 per cent of the commissioners have labor backgrounds, about 25 per cent have management backgrounds, while the remaining 30 per cent have worked at the law or in academic pursuits. It decided that prior experience of these types is desirable, and that the big factor is the integrity of the individual.

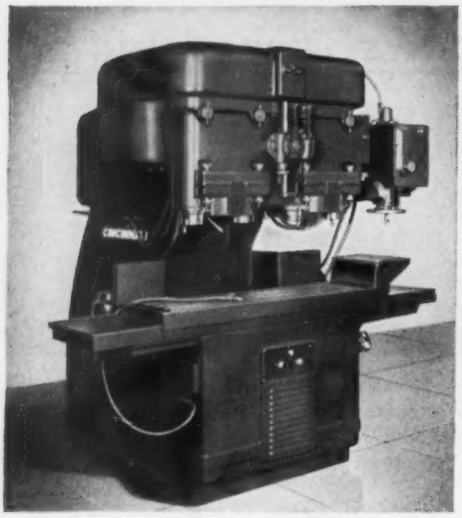
The Labor-Management Advisory Committee is composed of David Sarnoff, president, Radio Corp. of America; Vincent P. Ahearn, executive secretary, National Sand & Gravel Association, and former industry member of the National War Labor Board; Clarence O. Skinner, Automobile & Aviation Parts Manufacturers Inc.; H. W. Steinkraus, president, Bridgeport Brass Co.; Frank P. Fenton, director of organization, American Federation of Labor; Boris Shishkin, economist, American Federation of Labor; Richard Frankensteen, United Automobile Workers—CIO; and Clinton S. Golden, assistant to president, United Steelworkers—CIO.

Another important move has been the establishment of two additional regional offices. The service now has regional offices at Boston, New York, Cleveland, Atlanta, Kansas City, Mo., Chicago and San Francisco. Additional regional offices, it is planned, will be opened in other cities as time goes on and as the service can perfect organization details.

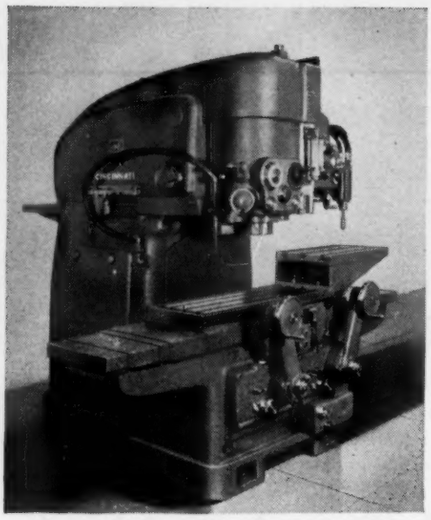
In addition, branch offices will be established, so as to allow the conciliation commissioners to function within smaller areas. The intention is to station men permanently in the various centers—preferably men already well known in those localities—and thus give them a better opportunity to get thoroughly acquainted with the figures in local industry, and to develop a better understanding of the local labor relations picture. As an illustration of this plan, the service thinks that the territory comprising Ohio, Michigan, West Virginia and Kentucky can be serviced more effectively by establishing branch offices at Cincinnati and Detroit instead of dealing with it entirely from Cleveland, the regional office, as at present. It plans to set up such branch offices shortly.

Still another important action is the establishment of a group of specialists trained to answer, or quickly find the answer to, any question that a practicing conciliation commissioner might encounter

(*Please turn to Page* 74)

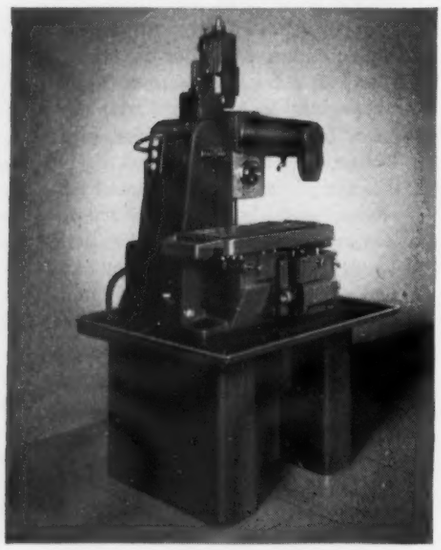


CINCINNATI Four-Spindle 360 Degree Automatic Profiler. Catalog M-1215.



CINCINNATI 16" Series Vertical Hydro-Tel Milling Machine. Specification sheet M-1388.

CINCINNATI Dial Type Milling Ma... Catalog M-970-3.



CINCINNATI No. 0-8 Automatic Rise and Fall Milling Machine. Catalog M-964-3.

CINCINNATI No. 0-8 Vertical Milling Machine. Catalog M-893-2.

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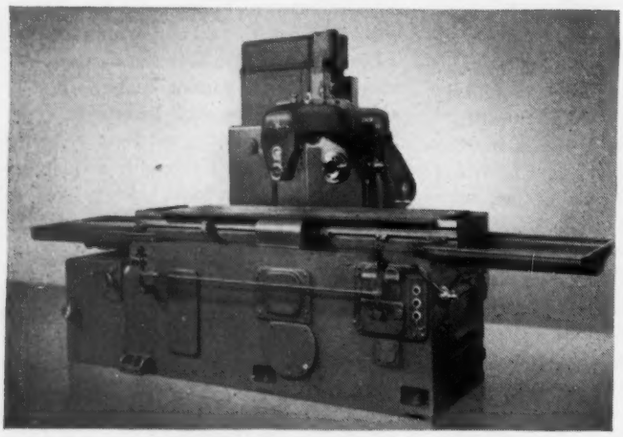


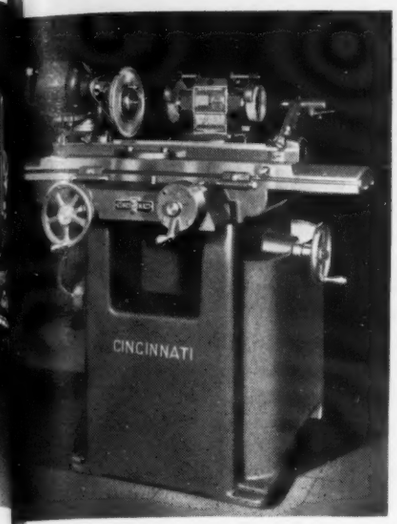
CINCINNATI Tracer Controlled Hydromatic Milling Machine.

CINCINNATI No. 1-18 Plain Automatic Milling Machine. Catalog M-848.

For a brief description of these machines, look in Sweet's Catalog File for Mechanical Industries.

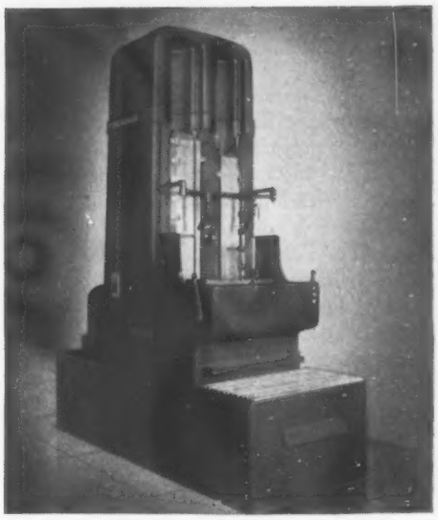
THE CINCINNATI MI

MILLING MACHINE



CINCINNATI No. 2 Cutter and Tool Grinder. Catalog M-962-3.

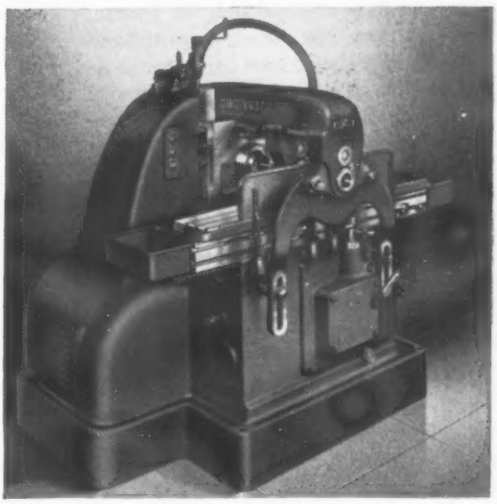
CINCINNATI Monoset Cutter and Tool Sharpener. Catalog M-1386.



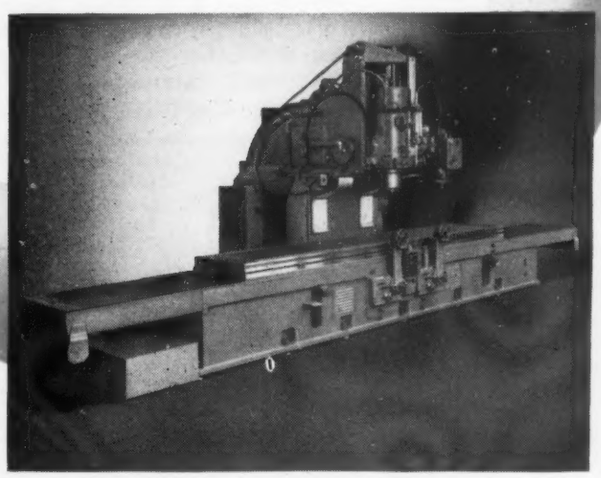
CINCINNATI Duplex (double ram) Vertical Hydro-Broach. Catalog M-1387.

The machines illustrated on these pages will give you an idea of the comprehensiveness of the Cincinnati line. A complete showing of all Milling, Broaching and Cutter Sharpening Machines manufactured by this company will be found in our recently published general Catalog No. M-1420. A copy will be sent on request. For full information and specifications on any of the machines illustrated, write for individual catalogs. Be sure to ask for them by the numbers shown beneath the illustrations of machines in which you are interested.

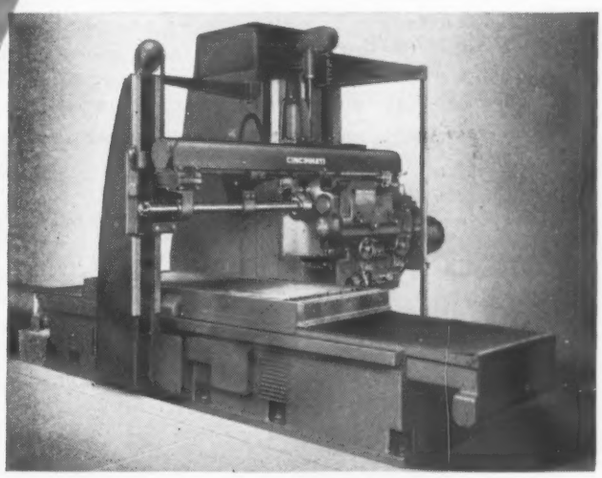
Turn to pages 12 and 13 of this issue of American Machinist for Cincinnati Cylindrical Grinding and Lapping Machines.



CINCINNATI No. 2-24 Plain Automatic Milling Machine. Catalog M-965-2.



CINCINNATI 28″ Series Vertical Hydro-Tel Milling Machine. Catalog M-1284.



CINCINNATI 36″ Series Horizontal Hydro-Tel Milling Machine. Catalog M-1285.

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BROACHING MACHINES • CUTTER SHARPENING MACHINES

(*Continued from Page* 71)

in his work. This group, after a special course of preparation, was sent out—one to each of the seven regional offices—on April 1. Hereafter when a commissioner encounters a difficult question in the middle of a case—and many of the questions that arise are tough ones—he can call up his office and talk with an expert who has the answer or who can get it for him without delay.

Perhaps the most significant feature of the overhauling process is the increased realization that the Conciliation Service can be only as good as its men—and the qualifications of a good conciliation commissioner of necessity represent an unusual combination.

"First," says W. Ellison Chalmers, chief of the Division of Procedures & Training, "he must have absolute integrity. Second, he must always be entirely impartial and fair. Third, he must have had some background of experience to enable him to deal with labor and management representatives as human beings with varying instincts, interests, emotions, habits, experience and training. Fourth, he must be able to maintain confidences and avoid making unwarranted disclosures to one of the parties in a dispute. Fifth, he must always bear in mind that conciliation is a voluntary process—so that he must depend on logic, mental resourcefulness and persuasion to help get a settlement in really tough cases . . . . When you add that all up it means that a good conciliation commissioner has to be a highly unusual individual."

With this concept in mind, the service recently inaugurated a new activity—the use of organized classroom methods to bring to its conciliators all the latest information and techniques for putting conciliation to work. The first class consisted of 25 of the newer men on the staff—including a number of veterans from the armed forces who previously had had experience in conciliation. This group was graduated on March 22 and was dispersed to the seven regional offices.

So satisfactory were the results of the course, says Mr. Chalmers, that it will be repeated. It should be especially useful to those more experienced men in the service who may elect to take it because of its "refresher" values.

"The emphasis," says Director Warren, "is on encouraging our commissioners to look upon conciliation as a career. It is a difficult business, requiring a highly specialized knowledge. In the course of study we used in March we feel we have a large part of the answer to the demand that the Conciliation Service be improved. It will give our 275 commissioners the help they need to keep abreast of the rapidly developing field of labor-management relations."

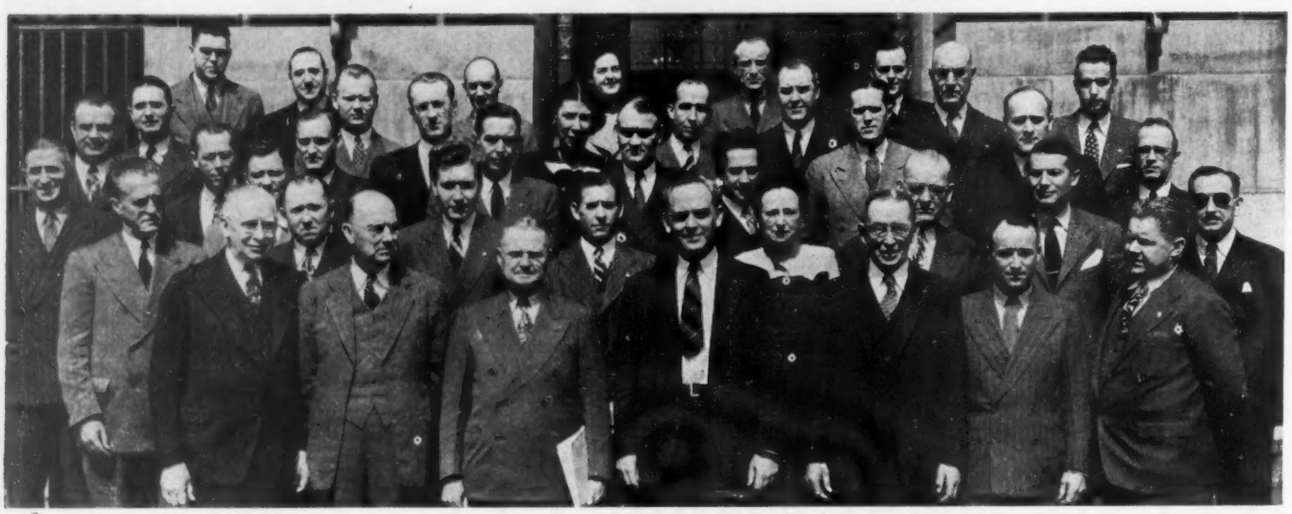
Many Subjects Studied

The course of study pursued in March well illustrates the wide range of subject matter which comes under the head of labor-management relations today. Two days were devoted to digests of the various labor laws—Wage-Hour, Davis-Bacon, Walsh-Healey, Norris-LaGuardia, National Labor Relations, etc.—and to the provisions of the Selective Service Act having to do with re-employment and treatment of veterans. A solid day was devoted to telling the students where they can get information of many different kinds having to do with labor-management problems. Two days were spent on clauses in many different types of labor contracts, including such angles as union security, company security, group insurance and pension plans, treatment of female workers, arbitration, seniority, handling of incentive pay and job evaluation, grievance procedure, etc. Two days were devoted to a thorough discussion of techniques of conciliation. Finally, a day was spent in taking the students around to the Washington offices of the American Federation of Labor, the Congress of Industrial Organizations and the National Association of Manufacturers, where they had a chance to get acquainted with some typical spokesmen for these national organizations.

Discussion leaders in this course included some 15 old-time conciliation commissioners who have had experience with almost every conceivable variation of employer-employee trouble. They also included spokesmen for the numerous agencies which administer labor laws or which play some role in the overall labor-management picture.

In fact, the faculty that administered this course constituted a galaxy of informed specialists. Included were:

Lewis B. Schwellenbach, secretary of labor; Conciliation Director Edgar L. Warren; Fred E. Desmond, director, Field Operations Division, Conciliation Service; W. Willard Wirtz, chairman, Wage Stabilization Board; Donald Wallace, economist, OPA; William S. Tyson, solicitor, Department of Labor; Donald M. Murtha, Arthur D. Hill Jr. and Kenneth Meiklejohn, assistant solicitors, Department of Labor; W. Ellison Chalmers, chief, Division of Procedure & Training, Conciliation Service; Harry Douty, director of labor economics, Bureau of Labor Statistics; Boris L. Stern, chief, Industrial Relations Division, BLS; Harry Ober, acting chief, Wage Analysis Branch, BLS; Collis Stocking, United States Employment Service; William G. Brown, chief, Technical Division, Conciliation Service; Commissioners D. Y. Heafner, Samuel Edes, William N. Margolis and J. A. Moran, Bureau of Labor Statistics; Harold E. Roberts, Industrial Relations Division, BLS; Martin J. O'Connell, associate director of field operations, Conciliation Service; Daniel



The new "Conciliation College" turns out its first class, members of which will serve as conciliation commissioners in the seven regional offices of the U. S. Conciliation Service. Experienced conciliation men in the foreground were teachers

Hurley, regional supervisor, Conciliation Service; Commissioner Charles A. LaValley, Conciliation Service; Henry L. Baker Jr., assistant chief, Technical Services Division, Conciliation Service; Peter S. Leach and Russell E. Stone, Technical Commissioners, Conciliation Service; David A. Morse, general counsel, National Labor Relations Board; Herbert Fuchs, National Labor Relations Board; Saul Wallen and Whittley E. McCoy, Arbitration Division, Conciliation Service; Charles Ray and Anna Weinstock, conciliation commissioners; Ernest T. March, regional director at San Francisco for Conciliation Service; James J. Spillane, regional director at Chicago for Conciliation Service.

Another step forward by the Conciliation Service is the creation of a Technical Advisory Committee, to work directly with the service's Technical Branch on incentive pay plans, job evaluation, and on problems calling for specialized technical knowledge or research. This committee is composed of Fred W. Climer, assistant to president, Goodyear Tire & Rubber Co.; W. B. Winans, Union Carbide & Carbon Corp.; Dr. E. B. Roberts, assistant to vice president in charge of industrial relations, Westinghouse Electric & Mfg. Co.; Lee H. Hill, vice president, McGraw-Hill Publishing Co.; Robert Watt, American Federation of Labor; Nelson H. Cruikshank, director of social insurance activities, American Federation of Labor; Herbert W. Payne, Textile Workers Union-CIO; Nathan Spere, United Electrical Radio & Machine Workers of America-CIO.

Single Industry Office Established

Still another new step is the establishment, at Akron, O., of the first office of the Conciliation Service to be devoted to to the labor relations problems of a single industry—rubber. It is in the nature of an experiment and was set up partly because of the availability of Paul W. Fuller, who for several years had worked with the rubber industry and was closely acquainted with both labor and management personnel and familiar with their joint problems. Mr. Fuller last week was assigned as mediator in the soft coal strike. If the Akron office demonstrates the values expected from it, other offices to be concerned with the labor relations of single industries—as, perhaps, the steel, automobile and other industries—may be established later.

Chief Edgar L. Warren of the Conciliation Service expects much work for his organization as time goes on.

"The field of labor-management relations—with which we in the U. S. Conciliation Service are concerned — has changed materially since the period of so-called normalcy preceding the depression of the 30s and the second World War. It has been estimated that union membership has increased from between 3 and 3½ million persons in 1930 to between 14 and 14½ million in 1945," says Mr. Warren. "We can make a reasonable guess that the terms and conditions of employment of approximately 47 per cent of the working population (excluding agriculture, domestic service, government and self-employed) are determined by about 50,000 collectively bargained union contracts. Every day approximately 100 of these contracts are being reopened and rewritten, and every day literally thousands of grievances are being settled under the terms of these existing agreements. In 1930 there was one large labor federation with which most unions were affiliated. In 1946 there are not only two such organizations, but also a number of large and lusty independent unions. Even more significant, the production techniques of the country have been almost fabulously improved . . . . The war has opened up untold new possibilities at the same time that it has created an upheaval in wage-price and employment-production relationships. In this economic setting, the wonder is not that there is so much industrial strife, but that there is not more!"

Occasionally the Conciliation Service receives complaints about individual conciliators. All are looked into carefully. Most complaints are found to be lacking a fair basis. Where the commissioner is found to be at fault some disciplinary action is taken. At the least his error is pointed out to him and he is warned not to repeat it. As in all business organizations, it has been found necessary to discharge a few employees who were found guilty of serious offenses.

The U. S. Conciliation Service was established by Congress in 1913, in the organic act creating the Department of Labor. Since then it has disposed of well over 100,000 disputes. In 1945 it handled 25,907 cases involving 14,506,121 workers; it brought settlement of 95 per cent of these cases without any stoppage in production.

First-Half 1946 Tin Allocations Announced

Final allocations of pig tin for the first half of 1946 totaling 18,300 tons have been made by the Combined Tin Committee. Recipients of about 84 per cent of the total were: United States, 6650 tons; France, 4260; United Nations Relief & Rehabilitation Administration, 3000; and Canada, 1500. Allocations apply to pig tin only. Tin concentrates and products containing large percentages of tin (such as solders) are not covered under the allocation agreement.

Additional imports into the United States in the second half of 1946, plus secondary recovery from scrap and tin from the government's stockpile are expected to make about 90,000 tons of tin available to American industry.

Wallace Urges Passage of National Health Program

More than 50 per cent of the working population suffers from one or more ailments, undoubtedly having a serious effect on productivity, Secretary of Commerce Wallace pointed out recently in supporting Senate bill 1606, calling for a national health program.

Stating there is a relationship of the health of workers to the incidence of industrial accidents, he said: "Such industrial accidents not only reduce production but also increase workmen's compensation premiums. No accurate estimate can be made of the cost to business of these losses due to poor health, but it is probably considerably higher than the cost of absenteeism due to illness and accidents."

Government Stockpiling Critical Materials, Ores

Storage of between 6000 and 7000 carloads of nickel, chrome and other ores has begun at the government reservation near Ravenna, O. Part of a large reserve of critical war materials, including the ore, will be stored on these grounds permanently.

According to Col. S. R. Stribling, commanding officer of the reservation, the more valuable ores, such as nickel, will be stored in tanks being erected on the ground; the less expensive ores will be piled in the open. Warehouses in the area are filled with steel and other metals including brass reclaimed from melted-down cartridge cases.

Administrators of Veterans Housing Program Named

Governmental agencies have announced the bureaus which will administer the Veterans Housing Program. Civilian Production Administration has formed a new Construction Bureau for this purpose. The following five bureaus of the Department of Labor will bear the primary responsibility in meeting the manpower problems of the housing program: United States Employment Service, Bureau of Labor Statistics, Conciliation Service, Apprentice Training Service, Wage Adjustment Board.

FOR OVER

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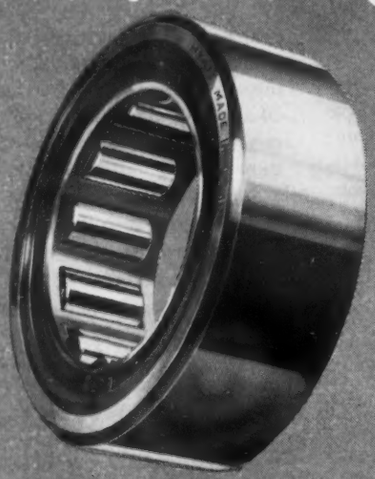
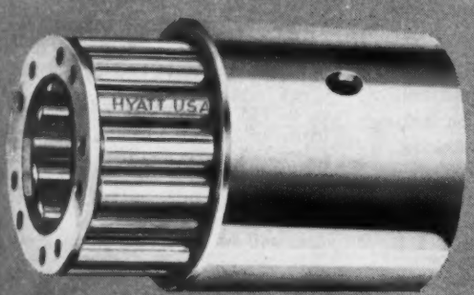
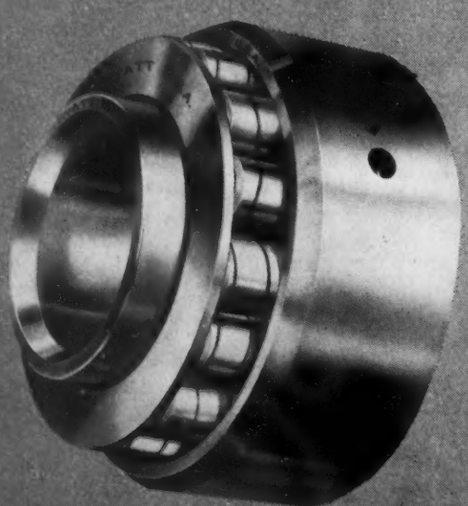
HYATT HAS BEEN SOLVING BEARING PROBLEMS







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ROLLER BEARINGS

mirrors of MOTORDOM

By A. H. ALLEN *Detroit Editor, STEEL*

Passenger car assemblies crowding 50,000 weekly mark. Soon may reach 75,000 weekly when General Motors divisions get rolling within next week or two. Ford truck and bus manufacture to be switched to Highland Park plant

DETROIT

ALTHOUGH it took about nine months to accomplish, production of passenger cars and trucks has finally pushed through a maze of obstructions and moved to a level something like normal. Assemblies are crowding the 50,000 weekly mark and will accelerate another 25,000, perhaps, once all General Motors divisions get rolling in a matter of a week or two. First units came off lines at all GM plants last week, and output will step up sharply because of a favorable position on materials and parts. There has been a notable improvement in sentiment throughout the industry in the past ten days, with the watchword, "More steam on production."

Effective this week, STEEL resumes its tabulation of production statistics, including monthly totals since the first of the year and weekly estimates to the date of publication. Since 1941 was the last prior year in which automotive production could be considered normal, comparisons are made with like periods in that year. Weekly estimates will be revised as final figures are received, delays being unavoidable because complete tabulations often are not available.

Ford Output Reaches New High

Ford production has now passed the 200,000 mark, almost evenly divided between passenger cars and trucks. Daily assemblies are exceeding 3000 units, and a recent figure showed in excess of 3400, a new postwar high. Sights have been drawn on 100,000 for May, as some easing of suppliers' difficulties has appeared.

A major change in Ford production facilities is being worked out over the next six months, involving the switch of all truck and bus production to the Highland Park plant and the installation of a new U-shaped truck assembly line 1410 feet long there with capacity of 500 per day or twice the capacity of the truck line currently in use at "B" building of the Rouge plant. The latter will be transferred to passenger car assembly, making three lines there busy on passenger cars. The present 540-foot bus assembly line, with capacity of 20 units per day, likewise will be moved to Highland Park.

Scene of all Ford manufacturing before construction of the Rouge plant, the Highland Park plant is a 6-story unit, leased in small part to other manufacturers and during the war the scene of aircraft parts and tank manufacture. It now houses tractor and agricultural implement assembly operations of the Ferguson organization, which occupy two floors, while four floors or 550,000 square feet will be turned over to truck and bus assembly. Over three miles of conveyor line will be installed to handle fabrication, metal finishing, degreasing, phosphate treatment, painting and storage and final assembly operations. The bus line will be completed by mid-summer, the truck line by mid-October. The move will entail expenditure of $2 million and will add 2500 to the present payroll of 10,500 employed at the 200-acre plant.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Tabulated by Ward's Automotive Reports

	1946	1941
January	121,861	524,073
February	83,841	509,332
March	98,870°	533,878
Week ended:		
March 30	43,070°	124,165
April 6	50,000°	116,255

°Preliminary estimate.

Disconcerting note in the Detroit production scene last week was the walkout of 5200 bus and streetcar operators, in complete defiance of recommendations of their AFL leaders and city charter provisions which require arbitration of disputes. The strike was engineered by a militant and hot-headed minority of the operators who were demanding 18 cents an hour increase and continuation of 53 hours guaranteed pay for 48 hours work. The municipally-owned system now pays about the highest wages of any transportation unit in the country and has acceded almost annually to demands for higher rates, to the point where operations are running in the red and capital investments are seriously curtailed.

The D. S. R. system carries about 800,000 riders daily, and it was expected the complete suspension would seriously curtail industrial production. On the first day, absenteeism ran somewhat higher than normally, around 15-18 per cent against 5-7 per cent, but the second day much improvement was registered, some plants reporting nearly a full complement of working forces. This indicates the extent of Detroit's reliance on the private automobile.

Annual financial report of General Motors, a voluminous and detailed document reflects in only minor degree the impact of the strike which started Nov. 21. Dollar volume of sales for 1945 followed the national pattern, declining 27 per cent from 1944, but still higher than any year prior to 1943. Four unusual income items in the report involve accounting procedures relating to the treatment of expenses incident to reconversion, amortization of special war facilities, carryback of unused excess profits tax credit, and sale of holdings in the National Bank of Detroit. The latter item alone resulted in a profit of nearly $14 million, creditable to the faith which the corporation had in the future of Detroit when it backed organization of the bank in the depths of the depression of 1933.

Employment and Payrolls Decline

Average number of salaried and hourly-rate employees on the payrolls for 1945 was 345,940, and total payrolls were slightly in excess of $1 billion. These figures are off 25 per cent from the level prevailing in 1944. Stockholders of record during the last quarter of 1945 numbered 425,647, 79 per cent of whom owned 50 shares or less. The GM financial report for the first quarter of this year unquestionably will be in considerably more somber hues.

Kaiser-Frazer Corp. was host to the

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press on a recent afternoon and set up a very tasty luncheon in dining room C of the administration building of the Willow Run plant, followed by a trip through the vast confines of the plant, inspection of a small department where Rototiller farm implements are being assembled, demonstration of the tiller in action, display of one each of the Frazer and Kaiser passenger cars, and a brief conference with President J. W. Frazer.

As for the plant itself, the great empty spaces where enormous bomber wings and fuselages once moved toward the flight apron completely dwarf the initial installation of paint-baking ovens and half-finished conveyor lines where Manager E. J. Hunt hopes to see some bodies and chassis moving within 30 days. No presses have yet been installed, and few body assembly fixtures or welding equipment were observable. It is the announced plan to buy principal stampings for Frazer bodies on the outside—roofs and side panels from Budd, doors from Hayes Mfg., hoods from Mullins, etc.—and to assemble them in fixtures at Willow Run, after which they will be rustproofed, painted and trimmed. All chassis elements, engines, transmissions, springs and the like also will be purchased from established manufacturers and assembled with bodies.

Mr. Frazer says his schedules call for possible completion of 100 Frazers in April, 500 in May, 2500 in June and 8000 in July. The Kaiser will be started sometime this summer but no production schedules have been determined. From the looks of the plant he is optimistic, but in view of orders already booked by dealers he would be foolish to be otherwise. Latest tabulation shows something like 275,000 Frazers and 270,000 Kaisers already spoken for. However, Frazer is not kidding himself that all these buyers will prove as good as their intentions, since it is known that thousands of prospective car buyers have placed orders with several dealers and will take the first car that comes along, canceling whatever other orders they have entered, or perhaps selling their priority to friends.

Plan 1500 Units Daily

At any rate, K-F hopes to turn out 125,000 cars over the balance of this year, which would take care of something under 25 per cent of their waiting customers, with an estimated 90,000 of these allocated to the fourth quarter of the year. When completed, the four adjacent Frazer and Kaiser assembly lines will produce 1500 cars daily in an 8-hour shift, each line being 9754 feet long. Other statistical detail of the operation includes such items as pouring of 500,000 square feet of concrete flooring, construction of 2950 body trucks for conveyor lines, 68,000 cubic feet of natural gas per hour in baking ovens, 36 electric motors on each of the four main conveyor chains.

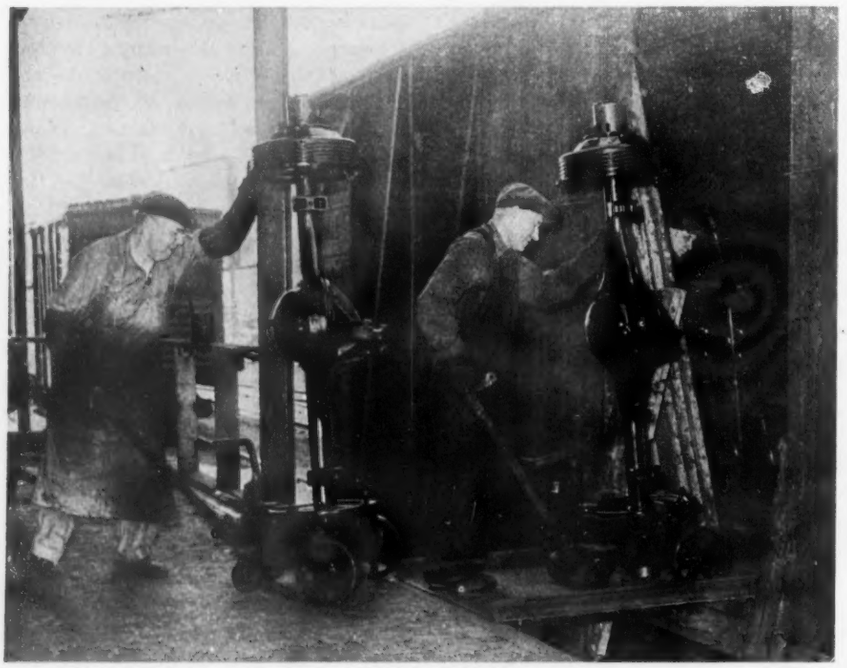
Kaiser and Frazer test cars have been on the road for some months traversing all types of terrain, and according to H. C. McCaslin, engineering chief, have developed no serious defects after a few thousand miles on the Kaiser and about 10,000 on the Frazer. In appearance, they look somewhat smaller than advance photographs of artists' conceptions. They are low and racy, simple and tasteful in decor, with no radical innovations other than the Kaiser's engine mounting system, front-wheel drive and torsion bar springs. Queried as to the status of the Stout model which at one time was announced as the third of the K-F new creations, Frazer said it was still in the experimental stage, with no plans for production.

The Rototiller farm tool is now in production and is largely an assembly and painting proposition. It involves a 5-horsepower two-cycle single cylinder gasoline engine of the air cooled type, built by Bell Aircraft at Burlington, Vt., mounted on wheels with 19-inch tread and powering a tilling mechanism comprising a cylinder of toothed wire tines which churn up the soil to a depth of about 9 inches. Frazer reports orders for something like 32,000 of the units now on hand and contemplates production of 20 an hour. It carries an OPA approved price of $395, fob Detroit.

Confirming earlier predictions here, Studebaker has announced it will be in production on 1947 passenger car models in the next three weeks, following recent partial shutdown of the South Bend, Ind., plant. Included in the changeover is the low-priced Champion model, about 20,000 of which have already been built, and the larger-size Commander model. The new cars are said to embody many mechanical and style changes. Meanwhile the company has started full-scale production in a new $1.5 million truck cab and pickup body factory which permits complete separation of truck and passenger car assembly. New truck models in ½, 1, and 1½-ton sizes will be available.

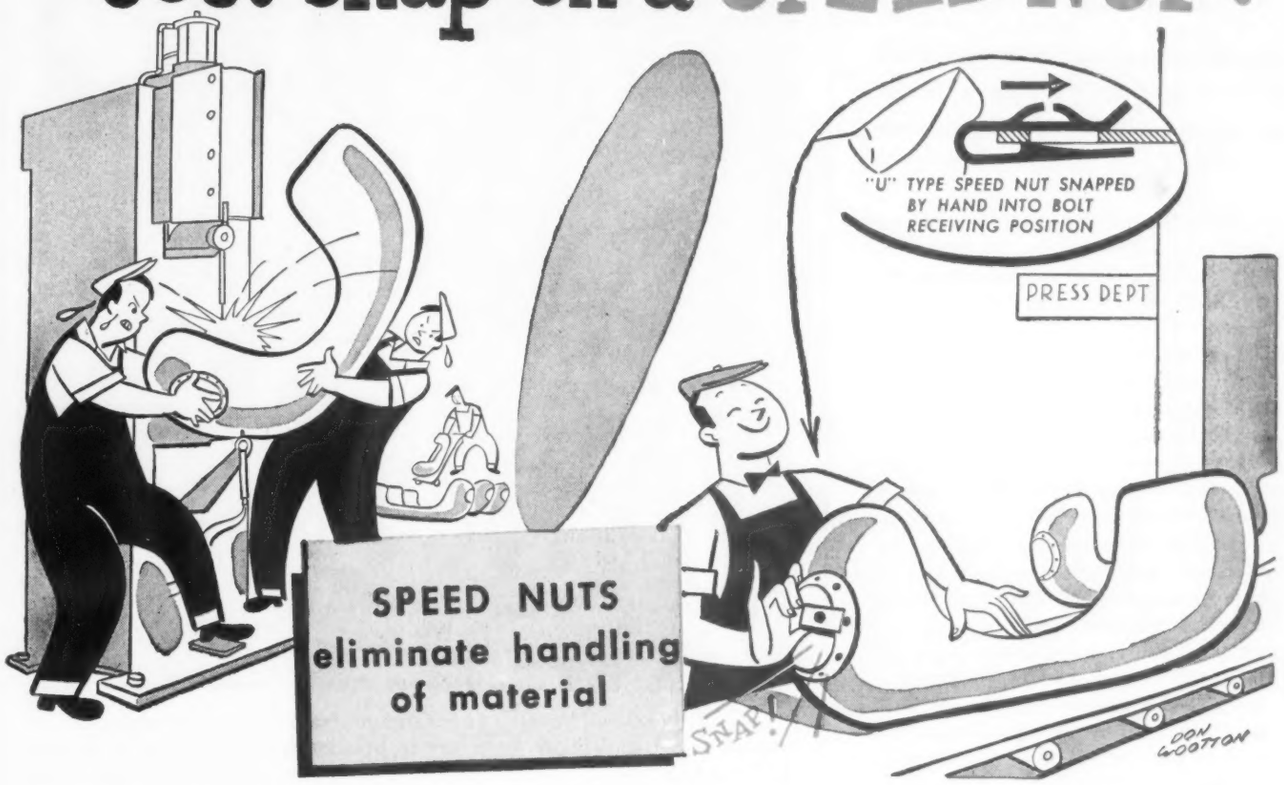
Saginaw Malleable Iron Division of General Motors is completing final negotiations for purchase of the Tilton Foundry at Danville, Ill., where heavy malleable castings for truck axles were produced during the war. It will be converted to a gray iron foundry for production of castings up to 50-pound weight for regular commercial use, while a new malleable foundry will be built on adjoining property.

Equipment for phosphate coating for all sheet metal body parts of Ford and Mercury passenger cars is being installed. Heretofore, the rustproofing treatment was limited chiefly to fenders and wheels, but is now being extended to other body elements. The customary spray process is being used.



Workers at Chevrolet Gear & Axle Division of General Motors load axles into box cars for transport to General Motors assembly plant as the company prepares to get into large-scale postwar production after being closed down by a 4½-month strike. NEA photo

Why do it the hard way ?
Just snap on a SPEED NUT !


"U" TYPE SPEED NUT SNAPPED BY HAND INTO BOLT RECEIVING POSITION
PRESS DEPT
SPEED NUTS eliminate handling of material
SNAP!
DON WOOTTON

A SPEED NUT CASE HISTORY

One car builder used four welding machines to attach cage nuts on fender stampings for head lamp assembly. Three men were needed for each machine . . . one hauled stampings from the press department and two more wrestled the stampings and located them in fixtures on the welder. Because of all this handling, stampings were frequently damaged. And after painting, threads had to be re-tapped.

Changing to self-retaining Speed Nuts radically reduced the costs of this operation! Two men now do this work on a conveyor and quickly snap the Speed Nuts into place by hand. We will be glad to give you complete details of this case history on request.

* * *

In Canada: Wallace Barnes Co., Ltd., Hamilton, Ontario
In England: Simmonds Aerocessories, Ltd., London
In France: Aerocessoires Simmonds, S.A., Paris
In Australia: Simmonds Aerocessories, Pty. Ltd., Melbourne

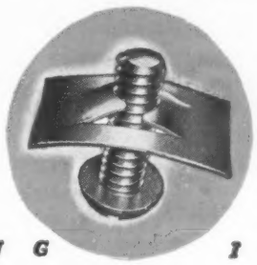
Time was when the only way to fasten a nut in place for blind location assembly was to weld, rivet or clinch a cage nut over the bolt hole. This anchored the nut . . . but man, what a job it was!

Changing to Speed Nuts really simplifies this type of operation! Effort is reduced to a fraction — hands freed for more productive work. Welding machines eliminated. Less floor space needed. And, there is less handling and easier final assembly. You get all this *plus* a better finished product because the spring tension lock of Tinnerman Speed Nuts *prevents vibration loosening.*

There are many types of self-retaining Speed Nuts . . . all designed to drastically reduce the cost of blind location fastening. Let us show you how they can be used on your product to effect really worth-while savings. Send in your assembly details today!

TINNERMAN PRODUCTS, INC.
2039 FULTON ROAD • CLEVELAND 13, OHIO

Speed Nuts*
PATENTED
MORE THAN 3000 SHAPES AND SIZES



* Trade Mark Reg. U. S. Pat. Off.

FASTEST THING IN FASTENINGS

Republic Steel Gets Mexican Ore Properties

Company continues to assure self of ample supply of high-grade ore. Latest acquisition would aid southern plants

RICH IRON ore properties in Mexico were acquired recently by Republic Steel Corp., Cleveland, in anticipation of exhaustion of free shipping ore in the Lake Superior region.

Revelation of this acquisition was made last week in the company's annual report to stockholders.

The Mexican properties are convenient to seaboard and will in time serve to meet the needs of Republic's southern plants, the report stated.

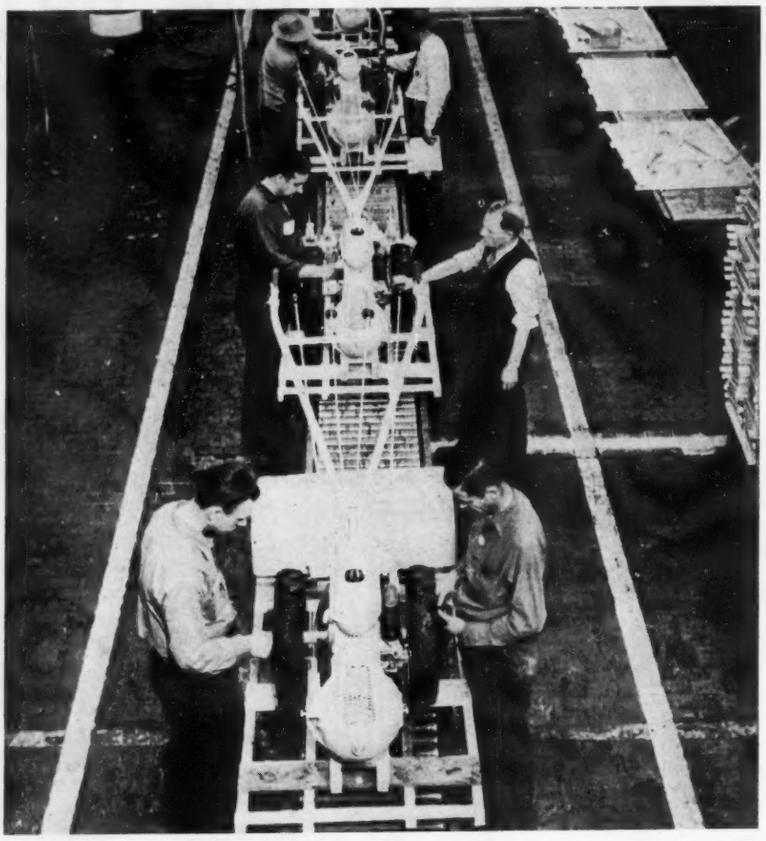
Republic began almost a decade ago to assure itself of an ample supply of high-grade ore. This was done through acquisition, by purchase or lease, of mining properties in northern New York. Although those properties are producing at the rate of a million tons annually they are only partially developed and hold definite promise of being an important factor in supplying Republic with high-grade ore.

The report to the stockholders pointed out that Republic now has the largest backlog of orders in its history. "The demand for steel is not only unprecedented in the domestic market, but the export market shows every indication of being increasingly important."

In their annual letter to stockholders, T. M. Girdler, chairman, and C. M. White, president, declared government regulations are slowing production instead of accelerating it.

They pointed out that the elements needed for prosperity are at hand but that government interference is a cloud on the economic horizon.

"During the war, restrictions were essential," they said. "Nor do we quarrel with the legitimate peacetime regulations necessary for the well-being of the country as a whole. But we do object, and object vigorously, to the maintenance of unnecessary wartime restrictions on the theory that the wartime emergency is still with us. Business management cannot continue to be held responsible for employment and prosperity when government interference is substituted for management's judgment," Mr. Girdler and Mr. White declared.



NEW FARM EQUIPMENT: First Graham-Paige Rototillers near end of assembly line at Willow Run, former bomber plant. The self-powered, 5-horsepower units churn and crumble the soil instead of turning it over as a plow does

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Geo. L. Mesker & Co., Evansville, Ind., has incorporated and has changed its name to Geo. L. Mesker Steel Corp.

—o—

Elgin Tool Works Inc., Chicago, has appointed George Scherr Co. Inc., New York, as exclusive representative for the New York area for precision bench lathes, screw machines and vertical and horizontal bench milling machines.

—o—

Santa Fe Railroad, Chicago, has announced a streamlined, stainless steel experimental refrigerator car which will be 5000 pounds lighter than conventional cars. The new car is expected to be in use by mid-1946.

—o—

M. T. Maguire, an engineer with many years of industrial and sales experience, has opened a manufacturers' agency at 418 Investment Bldg., Pittsburgh. Mr. Maguire previously was manager, coupling sales, Bartlett Hayward Division, Koppers Co., Pittsburgh.

—o—

Weirton Steel Co., Weirton, W. Va., will receive the Naval Ordnance Development Award on April 11 for work in connection with the development of a new naval torpedo battery.

—o—

Precision Welder & Machine Co., Cincinnati, has appointed Welding Engineering Sales Corp., New York, as exclusive representative for New York, New England and northern New Jersey.

—o—

Clayton & Lambert Mfg. Co., Detroit, has sold its Detroit plant used during the war in production of 40-millimeter shell cases to the Navy for use as "stand-by" arsenal facilities, for $672,500. The company will transfer its ex-

ecutive offices and manfacturing activities to Louisville, Ky.

—o—

American Society of Civil Engineers, New York, has established a $1600 fund to provide entrance fees and dues to the society for eight Latin-American university civil engineering graduates a year.

New Chicago Buyers Guide Gets National Distribution

The 11th annual edition of the "Buyers Guide and Industrial Directory of Chicago" is being distributed by the Chicago Association of Commerce. An industrial directory of the city, the guide is published to place before purchasing agents and other buyers the wide range of wares and services offered by Chicago manufacturers, wholesalers and service companies. Its contents include more than 30,000 listings of products or services available through approximately 8500 Chicago concerns.

New Toledo Company To Produce Steel Tubing

Maumee Industries Inc., Toledo, O., newly organized, has acquired the plant of the Lynch Mfg. Corp., that city, and is installing machinery to manufacture steel tubing and related products. Production is expected to start by Aug. 1.

The company, with $100,000 capital, has as its officers Albert F. Corey, president; Walter H. Seeman, vice president; Michael E. Haney, treasurer; and Elias Corey, secretary. H. E. Colwell, formerly with Toledo Steel Tube Co., is general manager.

Maker of Non-Fluid Oil To Celebrate Anniversary

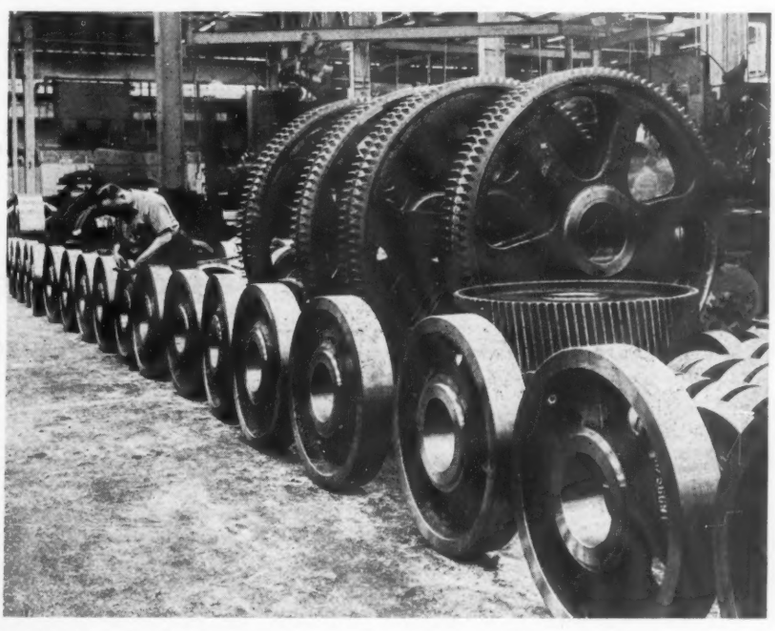
New York & New Jersey Lubricant Co., New York, will celebrate the fiftieth anniversary of its founding Apr. 21. Development of its product, "Non-Fluid Oil," began in 1896. Since that time, the company has grown into a world-wide organization with warehouses located in every large consuming center.

Reynolds Predicts Full Operation of McCook Mill

Full operation in six weeks was forecast recently by R. S. Reynolds, president, Reynolds Metals Co., Louisville, Ky., when the company took over the government-owned McCook (Ill.) aluminum sheet mill.

The mill will employ approximately 4000 when in full operation, and according to Mr. Reynolds, when the housing shortage has been abated, will be further expanded, providing employment for several hundred more.

Mr. Reynolds added that the company is still negotiating for the government-owned reduction plant at Troutdale, Oreg.



RAILROAD GEARING: Rim gears for electric locomotive drives and solid spur gears for diesel electric service await inspection and shipment at the Nuttall Works of Westinghouse Electric Corp.

Expansion Plan Announced by Tractor Firm

Caterpillar company will add 41 acres of floor space to its Peoria, Ill., plant. Production may increase this year

CATERPILLAR Tractor Co., Peoria, Ill., has announced plans for its largest expansion program, one which will add approximately 41 acres of floor space to the Peoria plant.

Although the project is not expected to be complete until the summer of 1948 the program is scheduled to be carried out progressively so that production can be increased in the near future. It is expected that the program will permit an increase in tractor production by September of this year and that other benefits will be felt increasingly in succeeding months inasmuch as little or no interruption to production and no interference with introduction of new models are anticipated.

A new factory for manufacture of diesel engines is the major project in Caterpillar's program. Planned to be superior to any plant now existing for efficient, economical manufacture of diesel engines, the factory will require 925,000 square feet under roof for manufacture of improved models of present types and sizes in the company's line, as well as additional models already past the research, development and engineering stages.

Announcement of the expansion program culminates two years of study and planning by the company while production facilities were devoted wholly to war needs. Purchase of quantities of new, more efficient machine tools and other factory equipment, as well as some construction work, is already under way.

Among other construction projects included in the expansion program are: A building with 400,000 square feet of floor area for expansion of tractor manufacturing; a 150,000 square foot area addition to the parts department buildings; two buildings totaling nearly 90,000 square feet of floor space for additional heat-treating facilities, new metallurgical laboratory, and storage of jigs and fixtures; and a centrally-located building containing 200,000 square feet of floor area, to house activities related to maintenance of the entire plant and provide adequate quarters for the sales, advertising and service departments.

Larger Steel Exports from U. S. Seen During Early Postwar Years

Tariff Commission report points to three factors in world situation contributing to larger tonnage movement. Volume may fall off in more distant future as competitive position of European industry improves

LARGER exports of iron and steel products from the United States are likely over the next few years, states the United States Tariff Commission in a report on the iron and steel industry just issued.

Three circumstances favor larger exports, according to the report: (1) The large backlog of demand created by the war in many countries, including the necessity of rehabilitating war-devastated areas; (2) the accumulation in several of the non-European countries of large reserve funds during the war; and (3) the probable almost complete absence of competition from the major continental European producing countries in markets outside Europe, since their reduced capacity will scarcely be able adequately to supply their own requirements and those of other continental countries.

These same conditions, says the report, are likely to make the competition of imports in the United States market less in the immediate postwar years than it was before the war.

Transport Factor Cuts Imports

Before the war, United States exports of iron and steel, although relatively small compared to production, were much larger than imports. The domestic industry has an advantage over foreign producers in transportation to the great inland markets of the country. Tariff duties averaged about 20 per cent ad valorem just before the war but they were less important in restricting imports of steel than the transportation factor.

"In the more distant future, and after the war-created demand in foreign countries is satisfied, the volume of United States exports may be smaller than in the immediate postwar years," the report states. "Whether or not the iron and steel industries of continental Europe will then be more or less efficient competitors with the United States industry than they were before the war will depend on the extent of rehabilitation of those industries and the relative technological progress in iron and steel in the United States and in those countries. United States exports at that time will also depend on the ability of iron and steel importing countries to export their own products, which in turn will depend on the degree of prosperity in countries to which they sell and the height of the duties and other trade barriers which those countries maintain.

"If existing rates of duty continue, the countries of continental Europe in long-term postwar period will probably be as efficient competitors in the United States market as they were before the war. If present duties on tonnage steel should be materially reduced, the competitive position of foreign producers would be somewhat strengthened, but it is improbable that imports would be able to compete at points more than a short distance from the ports of entry.

"As in the past, relative wage rates and productivity of labor will in the future greatly affect competition between domestic and foreign producers both in the United States market and in foreign markets. Before the war the disparity between wages in the United States and European countries was substantially offset in most branches of the industry by the greater productivity of labor in this country. Long-run trends in relative wages and productivity can scarcely be forecast.

"The competitive position of the United States steel industry both in domestic and foreign markets will be affected also by recent and future developments in (1) the supply of iron ore and other raw materials, (2) price policies and the use made of the basing-point system, and (3) integration of ownership, as well as geographical and industrial concentration of productive capacity and demand."

The commission's report points out that when war ended the United States had a total capacity for making steel of nearly 96 million tons, or more than half of the world's capacity. The industry's impressive wartime production record was made possible because steelmaking capacity was more fully used; on the average 97 per cent in 1941-44, compared with 65 per cent in 1939. There were many technological improvements, and an important factor was the wartime plant expansion which added to the nation's capacity.

"One postwar problem which demands immediate solution," states the report, "is the disposal of government-owned facilities in which the government has invested more than $1 billion. Government policy as to disposal will be of great importance to the industry, particularly in the far west, where expansion was relatively greater than in any other section.

"However, unlike the industries producing synthetic rubber, aluminum, magnesium, ordnance, ammunition, airplanes, and ships, which during the war expanded their productive capacity to levels far in excess of peacetime demand, the iron and steel industry made increases of hardly more than one-sixth in crude-steel capacity, and only about one-fifth in pig iron capacity. It is expected that the backlog of demand for iron and steel will keep most of the industry's capacity in operation for several years. Therefore, the problem of disposal of war-built capacity is less serious in this industry than it is in many other industries, and the loss on the government's wartime investment is likely to be correspondingly less."

CPA Warns Steel Supply Will Be Inadequate To Care for Estimated 1946 Export Demands

STEEL exports during the next two years will raise a number of special problems, according to the monthly report of the Civilian Production Administration.

Before the war, the report points out, exports accounted for only a small part of total U. S. steel production. However, with the partial paralysis of several foreign sources of supply, export demand for American steel is expected to be abnormally high during 1946 and 1947.

Present prospects are export shipments will fall short of foreign demand by a large margin. For 1946 it is estimated export demand will total 8 million tons of finished steel, about 15 per cent of total expected output. This is more than three times the average annual shipments in the 1937-1939 period, but is less than the proportion exported in 1919 when conditions abroad were somewhat similar to the situation today. In that year more than 4.5 million tons were shipped.

More Dealers Licensed by WAA to Sell Machine Tools and Equipment

LIST of "approved dealers" who have been licensed by the War Assets Administration to sell government-owned surplus machine tools and equipment is increasing steadily. The following individuals and firms have been placed on the approved list, making a cumulative total of 1386 as of March 15. Field offices have an additional 144 appointments which are awaiting official approval and have 386 applications which are being screened.

Previous lists appeared in the following issues of STEEL: April 1, p. 128; March 18, p. 87; March 11, p. 81; Feb. 25, p. 67; Feb. 4, p. 101.

New Jersey

Newark: J. R. Edwards Machinery Co., 28 Edison Place; Burris of Essex County Inc., 416 Central Ave.; Martin Kaufman, 325 Elizabeth Ave.; H. E. Eaton Co., 1180 Raymond Blvd.; United Rubber Machinery Exchange, 319 Frelinghuysen Ave.; Industrial Equipment Co., 868 Broad St.

Camden: G. C. Wyatt Machinery Co., 1203 Princess Ave.; Orange: David Lanier, 291 Cleveland St.; East Orange: Thomas M. Eagan, 392 Central Ave.; Springfield: Dwight H. Boss, 35 Salter St.; Scotch Plains: William V. Nickau, R. F. D. No. 1; Elizabeth: Milton Olim, 320 Monmouth Rd.; Roselle: Eugene P. Reading Inc., Walnut St. & B. & O. Railroad.

Pennsylvania

Pittsburgh: Somers, Fitler & Todd Co., 327 Water St.; Rees Machinery Co., 1012 Empire Bldg.; Galbreath Machinery Co., 306 Empire Bldg.; Wilkes-Barre: Ensminger & Co., 57 Wood St.; Eagleville: Max K. York, Box 25; Allentown: Stewart S. Kichline, 2042 Hanover Ave.; Wm. H. Taylor & Co. Inc., 236 Hamilton St.; Reading: J. H. Sternberg Jr., 957 Centre Ave.; Plains: Berrettini Electric Co., 378 N. Main St.

Philadelphia: Herman D. Jaffe, 119 N. Third St.; B. M. Weiss Co., 1601 Girard Trust Co. Bldg.; Arcway Equipment Co., 3717 Filbert; J. H. Wood, 1033 D Broad St.; Herman L. Winterer, 953 N. Front St.; Morgan Tool & Equipment Co., 18 W. Chelten Ave.; General Tool Sales Co., 3915 N. Broad St.; M. J. Hunt's Sons, 1604 N. Delaware Ave.; DoAll Philadelphia Co., 3107 N. Broad St.; Eagle Machinery Sales Co., 1732 Fairmount Ave.; William P. Swift Inc., 1248 Commercial Trust Bldg.; Gattie Tool Co., 100 N. Third St.; Austin G. Yockey, 709 Bellevue Court Bldg.; T. B. MacCabe Co., 4300 Clarissa St.; Earl G. Oppenheim, 2100 Walnut St.

Rhode Island

Woonsocket: Taft-Pierce Mfg. Co.

Tennessee

Chattanooga: Noland Co. Inc., 115 Market St.; Robbins Equipment Co., 535 Chattanooga Bank Bldg.

Memphis: Industrial Mchy. & Supply Co., 914 Commerce Title Bldg.; O. C. Collins Machinery Co., 358 Madison Ave.; George T. McCall, 673 Shrine Bldg.; Richman-Crosby Co., 223 S. Front St.

Texas

San Antonio: G. C. Wilson, 1510 Majestic Bldg.; Alvarado: William C. Faubion, Box 293; San Angelo: B. & B. Trading Co., 26 E. Concho; Fort Worth: Hammel Machine Co., 2617 McLemore; Lubbock: Crow Machine & Equipment Co., 302 Avenue O.

Dallas: Western Engineering & Sales Co., 1134 Liberty Bank Bldg.; Alden Van Kirk, 2800 Canton St.; Bowles Machinery Co. Ltd., 3406 Main St.; Myers & Landrum, 5306 Harry Hines Bldg.

Houston: Oliver H. Van Horn Co. Inc., Franklin & Austin Sts.; C. J. Harter Machinery, 4000 Clay St.; Sam H. Penny, 408 Petroleum Bldg.; Big Three Welding Equipment Co., Box 3047; United Metals, 4930 McKinney Ave.; G. F. Cotter Supply Co., 318 Union National Bank Bldg.; H. L. Thompson Co., 2207 Second National Bank Bldg.; A. Byron Smith, 3754 Sunset Blvd.

Vermont

Springfield: Bryant Chucking Grinder Co.; Fellows Gear Shaper Co.; Windsor: Herbert L. Cummings, 8 Lowell St.; Cone Automatic Machine Co. Inc.; Bennington: Mill Supply Co.

Virginia

Norfolk: Standard Machine & Supply Co., 137 E. Olney Rd.; R. G. Brugh Machinery Co., 2712 Colley Ave.; Roanoke: Southern Machinery & Supply Co., Box 1910.

Washington

Wenatchee: E. T. Pybus Co.; East Kennewick: Arthur C. Carpenter, 315 Avenue C.

Spokane: Jack Reding, 118 S. Division; Inland Machinery Co., E. 215 Sprague Ave.; Hobart Welder Sales & Service, 923 W. First Ave.; Stare Machinery Co., 411 Hyde Bldg.; Inland Truck & Diesel Co., E. 25 Third Ave.; Metals & Machinery Sales Co., 1420 E. Fifth Ave.; R. H. Mills, 321 Symons Bldg.

West Virginia

Parkersburg: Parkersburg Machine Co.

Wisconsin

Milwaukee: E. A. Kelly Machine Tool Co., 193 S. Second St.; Raylo Welding & Electrical Supply, 1021 N. Water St.; Eldon Co., 1214 N. Water St.; Quirk & Hagenbuck, 610 W. Michigan; Northwestern Electric & Machinery Co., 450 N. Plankinton Ave.; DoALL Wisconsin Co., 2427 W. North Ave.; Stone Co. Inc., 610 W. Michigan St.; Merit Machine Tools Co., 617 W. Virginia St.; South Milwaukee: Harris Machinery Co., 600 Elm Ave.

Wyoming

Laramie: Laramie Automotive Parts Co., 406 S. Second St.

Return of 43.9 Per Cent Realized on Surplus Sales

Sales of surplus capital and producers goods, industrial plants and aircraft increased in February, reaching a new high of $1,086,740,000. The government recovered on these sales $477,066,000, or a return of 43.9 per cent of original cost.

During February, 20.6 per cent less capital and producers goods were declared surplus for disposal than in the preceding month, while actual sales increased 6.1 per cent. During the same period, 95.5 per cent more industrial plants and plant sites were declared surplus for disposal with sales increasing by 134 per cent.

Cumulative sales of machine tools through Feb. 28 topped other groups of capital and producers goods, showing an increase of $19,416,400 for the month. Used machine tools costing $135,774,000 were sold for $72,707,000.

Second most important in volume of sales is the steel group, items costing $58,977,000 being sold for $32,434,000, or 55 per cent recovery of cost. Sales of the various items on the basis of cost and selling prices, respectively, were as follows: Bars, $13,188,000 and $5,018,000; sheets, $8,227,000 and $6,050,000; rolled plates, $7,096,000 and $4,480,000; pipe, $7,095,000 and $3,735,000; tubing, $4,580,000 and $1,841,000; blooms, billets and slabs, $4,267,000 and $1,908,000.

Omaha Steel Works Offered For Sale or Lease by WAA

Omaha Steel Works, Omaha, Nebr., which cost the government $641,000 to design and equip to produce steel castings, is offered by the War Assets Administration for sale or lease. Rated capacity is 4000 tons of steel castings a year.

Other WAA offerings include an iron ore reduction plant, Charleston, S. C.; aluminum forging plant, New Castle, Pa.; steel forging plant, Chambersburg, Pa.; tube and pipe plant, Baltimore, Md.; magnesium and ferrosilicon plant, Spokane, Wash.; aluminum and magnesium extrusion and forging plant, Halethorpe, Md.; aluminum extrusion plant, Adrian, Mich.

WAA is also offering for sale in a nation-wide continuous program about $1 million worth of steel wire insect screen.

Bureau of Mines Appoints 11 Engineers as Advisers

Appointment of a synthetic liquid fuels technical advisory group composed of 11 outstanding chemists and engineers from industry has been announced by Dr. R. R. Sayers, director, Bureau of Mines.

Members of the group are: Eugene Ayers, staff chemist on process development, Gulf Research & Development Co., Pittsburgh; George Creelman, research engineer, Pittsburgh Consolidated Coal Co. Inc., Pittsburgh; Fred Denig, vice president and director of research, Koppers Co., Pittsburgh; H. W. Field, assistant manager, research and development department, Atlantic Refining Co., Philadelphia; H. O. Forrest, director of research, M. W. Kellogg Co., New York; Dr. Louis S. Kassel, research engineer, Universal Oil Products Co., Chicago; P. C. Keith, president, Hydrocarbons Research Inc., New York; L. C. Kemp Jr., director of research, Texas Co., New York; E. V. Murphree, vice president in charge of research and development, Standard Oil Development Co., New York; J. K. Roberts, director of research, Standard Oil Co. of Indiana, Chicago; and Dr. Harold J. Rose, vice president and director of research, Bituminous Coal Research Inc., Pittsburgh.

MEN of industry

Charles Heintz, general sales manager, Elastic Stop Nut Corp. of America, Union, N. J., has been elected vice president in charge of sales, a new office.

—o—

Joshua L. Johns, Green Bay, Wis., succeeds **A. E. Schumacher** as president, Norcor Mfg. Co. Inc., Green Bay. Mr. Schumacher, head of the company for the past 5 years is retiring. **Harold E. Fuller**, former sales manager of the company and now president, Roberts Numbering Machine Co., Brooklyn, N. Y., was elected first vice president; **Herbert Olson**, president, Olson Transportation Co., DePere, Wis., second vice president; **John Krogh**, secretary; **Anton Stadler**, treasurer. **A. A. Maurer** remains as general manager.

—o—

George L. Todd, comptroller, Bullard Co., Bridgeport, Conn., has been elected to a vice presidency of the company. **E. P. Bullard III**, vice president in charge of manufacturing, has been appointed assistant general manager.

—o—

Frederick J. Mayo, Albert P. Durso, Murray E. Johnson and **Donald W. Neville** have been elected vice presidents of the F. H. McGraw & Co., Hartford, Conn., engineers and constructors.

—o—

Harry Bottomley has been appointed sales representative in the southern Pennsylvania and Virginia territory, Wickwire Spencer Steel Division, Colorado Fuel & Iron Corp. He replaces **H. C. Stults**, resigned.

—o—

Kenneth A. Moody has been appointed training director, covering all plants of the American Steel & Wire Co., Cleveland. Mr. Moody was identified with personnel and training education in the company from 1937 until he entered the armed forces in December, 1943. He obtained his discharge in January, 1946.

—o—

Robert L. Wolff has been named chief radio and electronics engineer succeeding **H. W. Rubenstein**, and **Rolland R. Roup** succeeds **G. Milton Ehlers** as chief ceramic engineer, Centralab Division, Globe-Union Inc., Milwaukee.

—o—

William F. Newton has been appointed manager of market research and development, Columbia Chemical Division, Pittsburgh Plate Glass Co. **Dr. Alphonse Pechukas** is director of research. **Clifford C. Thompson** has been named credit manager, Columbia Division, with offices in Pittsburgh.

—o—

Donald Dunwody has been appointed assistant branch manager, New York sales district, Phosphate Division, Monsanto Chemical Co.

—o—

Harold L. Adamson has been appointed factory representative in the San Francisco area for the Wales-Strippit Corp., North Tonawanda, N. Y.

—o—

Chris H. Bartlett has been appointed manager, **A. E. Black**, general foreman and **Frank E. Baker**, section engineering manager, of the recently organized specialty transformer department, Sharon Transformer Division, Westinghouse Electric Corp. **W. D. Ligon** has been named works manager of the company's new Buffalo plant into which the Motor Division is moving from East Pittsburgh, Pa.

—o—

R. H. MacGillivray has been named to the newly-created post of regional supervisor, Pacific Coast area, Westinghouse Electric International Co., with headquarters in San Francisco.

—o—

R. M. Coburn, recently resigned from the National Association of Manufacturers with which he was engaged in marketing research, has been appointed sales manager for Panoramic Radio Corp., New York.

—o—

Archie J. Kashubeck, sales agent at San Francisco for National Malleable & Steel Castings Co., Cleveland, has been named by that company as district railway sales manager with headquarters in San Francisco.

—o—

Bryant Heater Co., Cleveland, has appointed three representatives for distribution and application of gas elements for manufacturing and process equipment. They are: **Lawrence R. Foote**, who will be located in New York to serve the eastern area; **Oliver Stirling Jr.**, whose headquarters will be in Detroit and who will serve Michigan and six counties in Ohio; and **Carl Mansfield**, who will be associated with Mr. Stirling.

—o—

R. H. Swartz has resigned as chief metallurgist and superintendent of steel production with Ordnance Steel Foundry, subsidiary of Campbell, Wyant & Cannon Foundry Co., Muskegon Heights, Mich., to devote his time to Ferro-Bronze Corp., Moline, Ill., of which he is now part owner and president.

ALBERT J. HULSE

—o—

Albert J. Hulse, formerly with Carnegie-Illinois Steel Corp., Pittsburgh, has joined Youngstown Sheet & Tube Co., Youngstown, as chief engineer. He succeeds **J. D. Jones** who left the Youngstown company about a year ago. Mr. Hulse joined Carnegie-Illinois in 1935, and he has served as chief engineer of its South Chicago works. Later he was transferred by United States Steel Corp., to serve as chief engineer on construction, Geneva Steel Works, Provo, Utah. Upon completion of the Geneva project, he returned to Carnegie-Illinois as senior staff engineer in the Pittsburgh office.

—o—

Gilbert L. Cox, metallurgical and chemical engineer who has been associated with International Nickel Co. Inc., New York, since 1931, heads the company's newly opened Empire State Technical Section of its Development & Research Division. The new section, with headquarters in the Genesee Valley Trust Building, Rochester, N. Y., will furnish technical information and assistance to industry in New York state, excluding New York city, the Albany area, and the Hudson River valley.

—o—

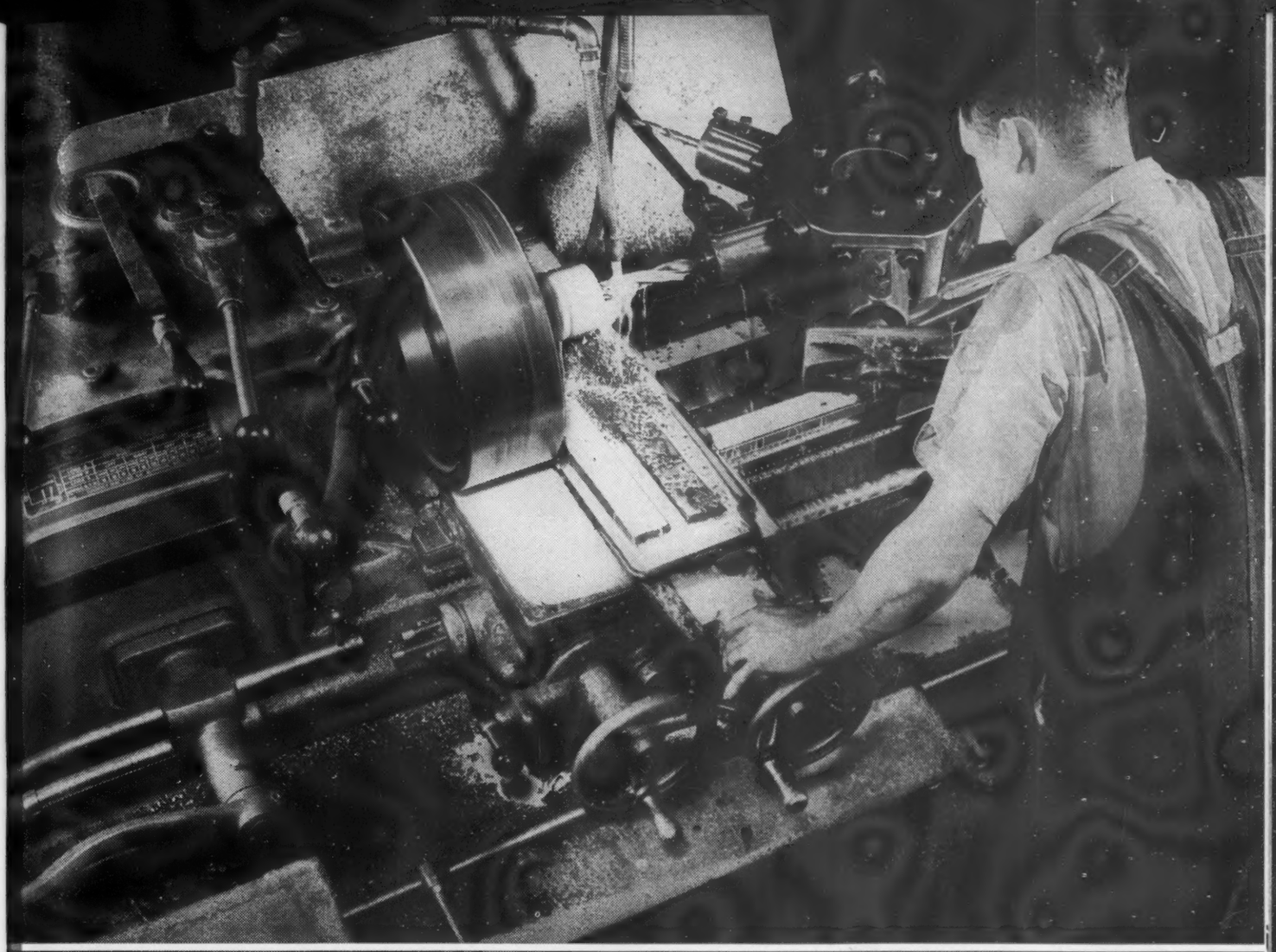
R. W. Pflug has been promoted to national accounts manager for Detrex Corp., Detroit. He has been central regional manager for the company.

—o—

C. B. Parsons of Michigan Tool Co., Detroit, has been placed in charge of a branch office the company has opened at 739 North Broadway, Milwaukee.

—o—

R. C. Owens has returned to his position as secretary, Osgood Co. and General



DRILLING AT *297 S.F.P.M.*

SUNOCO EMULSIFYING CUTTING OIL

Maintains Tool-Life at High Cutting-Speeds

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Machine: Gisholt No. 5 ram-type universal turret lathe.
Material: Cast iron.
Feed: .015".
Cutting Speed: 297 s.f.p.m.
Cutting Lubricant: 1 part Sunoco to 20 parts water.

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Sunoco cools and lubricates both the work and tools, flushes out chips, preserves cutting edges. Sunoco makes possible a high rate of production, continuous operation at low cost. Call the Sun Cutting Oil Engineer — he can help you with your new metal-working problems.

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SUN
SUNOCO
INDUSTRIAL PRODUCTS

R. J. SWING

EDWARD P. GEARY

HERBERT P. LADDS

Excavator Co., both of Marion, O., after serving nearly 3 years with the Navy.

—o—

R. J. Swing has been appointed general sales manager, Bunell Machine & Tool Co., Cleveland. Mr. Swing has been in the field of metal manufacturing and sales for the past 26 years.

—o—

C. C. Hermann has been named special representative for the sale of dust collector and spark suppressor equipment manufactured by Whiting Corp., Harvey, Ill. His territory includes Indiana, Michigan, Ohio, western New York and eastern Pennsylvania.

—o—

Robert R. Pierce, member of the technical service department, Pennsylvania Salt Mfg. Co. of Washington, has been appointed sales service representative, Special Chemicals Division, Pennsylvania Salt Mfg. Co. His territory includes Washington, Oregon, Idaho and Montana with offices in Tacoma, Wash. **G. Webber Knight** has been appointed manager of the company's Washington office. **Alexander J. Cassatt,** vice president, Western Saving Fund, has been elected to the board of directors of the Pennsylvania Salt company.

—o—

George Smith has returned from 2½ years' service with the Army, and has been named sales supervisor for cranes and hoists, Conco Engineering Works, Mendota, Ill.

—o—

E. A. Watson, until recently production manager at the Buffalo plant, American Car & Foundry Co., has been appointed assistant engineer of that company's Improvement Division.

—o—

Alvin H. Berndt recently joined the National Founders' Association, Chicago, to serve in its public relations work. Prior to his service with the Navy, Mr. Berndt was with the Youngstown Sheet & Tube Co., Youngstown, O., in promotion and development work, and during 1941 and 1942 served with the Iron & Steel Branch, WPB, Washington. **Robert D. Hand** also has been appointed to the staff of the association. He will specialize in technical and job evaluation problems and assist **Gottfrid Olson,** foundry engineer, in his work with the association.

—o—

Edward P. Geary, formerly assistant vice president in charge of sales, Rustless Iron & Steel Corp., Baltimore, has organized the Geary Stainless Steel Co., Baltimore, sales service engineers to handle stainless steels in all forms. **Robert L. Springer,** formerly Chicago district manager, Rustless Iron & Steel Corp., is in charge of the Chicago office of the Geary company.

—o—

W. W. Hodgson, chief industrial engineer, Continental Can Co. Inc., New York, retired Apr. 1 under the company's annuity plan. Mr. Hodgson, who had been associated 22 years with Continental, is succeeded by his assistant, **L. C. Walgash.**

—o—

Dwight Adams, formerly with the Heppenstall Co., Pittsburgh, has been appointed head of the Philadelphia office of the Pittsburgh Steel Foundry Co., Glassport, Pa., and will represent both the Pittsburgh Steel Foundry Corp. and the Ft. Pitt Castings Division of that company.

—o—

Roger F. Mather, former chief metallurgist for Willys-Overland Motors Inc., Toledo, O., has been appointed chief metallurgist for Kaiser-Frazer Corp. and Graham-Paige Motors Corp., Detroit.

—o—

Ralph E. Ablon and **Herbert B. Luria III,** lieutenants in the Navy, have been released from service and have rejoined Luria Bros. & Co. Inc., Philadelphia. Mr. Ablon will be connected with the company's New York office and Mr. Luria will be associated with the company's St. Louis office.

—o—

Herbert P. Ladds, president, National Screw & Mfg. Co., Cleveland, and president, Cleveland Chamber of Commerce, has been elected a director of Hydraulic Equipment Co., Cleveland. He fills the vacancy caused by the death last fall of **Horace B. Keeler.**

—o—

Leon Falk Jr. and **M. A. Smith** have been elected directors of Edgewater Steel Co., Oakmont, Pa. Mr. Falk succeeds his uncle, the late **Maurice Falk.** Mr. Smith, vice president and general manager, succeeds **J. H. Baily,** who is retiring.

—o—

Charles Webber, formerly New York district manager, Bristol Co., Waterbury, Conn., has been named managing director, Bristol Co. of Canada Ltd., Toronto, Ont. **H. A. Van Hala** has been named the company's district manager at Cleveland, being transferred from the Birmingham branch where he has been district manager since 1935.

—o—

Charles E. Wilson, vice president, Worthington Pump & Machinery Corp., Harrison, N. J., has been elected president of the Worthington-Gamon Meter Co., Newark, N. J., a subsidiary. **C. A. Packard** was elected vice president and controller.

—o—

E. B. Stanley, president of American Laundry Machinery Co., Cincinnati, has been elected to the newly created post of chairman of the board of directors, and **Harvey H. Miller,** vice president, has been elevated to president.

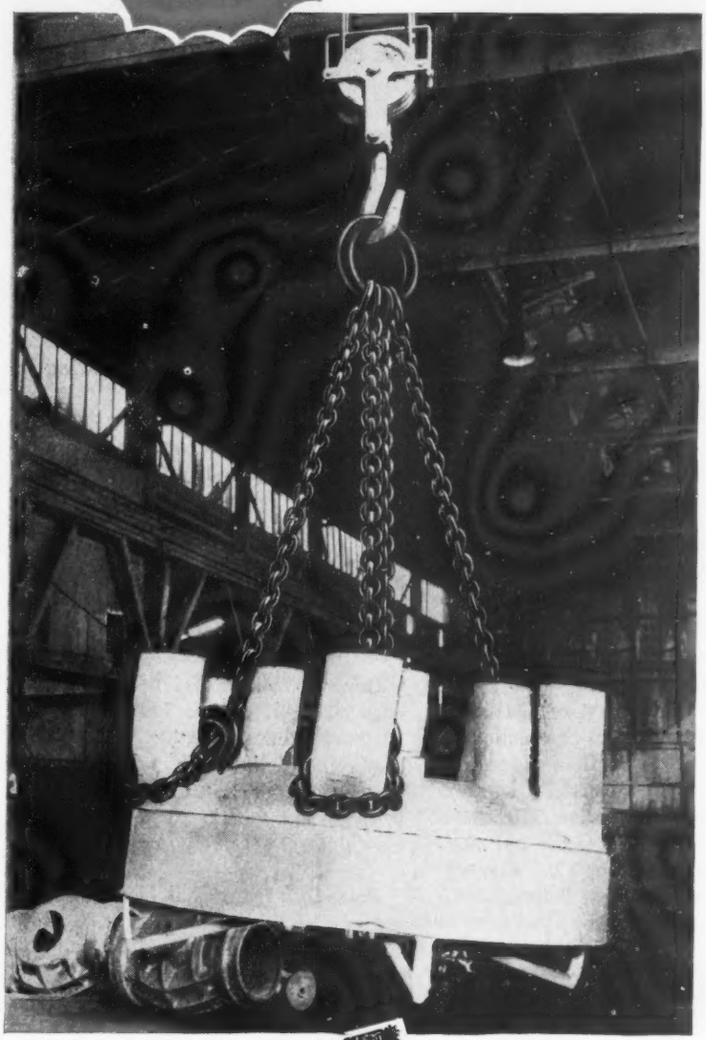
—o—

Howard N. Williams, who during the war was a field engineer for the Navy and chief of the instrument laboratory of the Glenn L. Martin Co., Baltimore.

Where Safety Is of First Consideration Specify

Certified Tested

CLEVELAND SLING CHAINS



FOR dangerous overhead lifting, particularly where shock loads must be handled, safety recommendations call for wrought iron sling chains. Cleveland Sterling Grade Wrought Iron Sling Chains provide the highest degree of protection against sudden breakage. Made only by highly skilled chain makers, Cleveland Sterling Grade Sling Chains are unsurpassed for heavy-duty lifting where the safety factor is paramount.

All Cleveland Sterling Sling Chains are furnished with rings and sling hooks unless otherwise specified. Supplied in single, double, 3-way or 4-way slings or in any special pattern sling chain.

All fittings supplied on Cleveland Sling Chains are tested and are more than equal in strength to the chain on which they are used.

Certificate of Test
This is to Certify, that we have tested the
Sterling Dredge or Crane Chain to a Proof Strain
of 8,960 lbs. made for The Smith Manufacturing Co.
on Order No. 53864 4
CC.B. 1246
our Register No.
THE CLEVELAND CHAIN & MFG. CO.
Signed E. A. Round
Certificate No. 2886 4
Date June 20 1945

Skilled chain makers with The Cleveland Chain & Mfg. Co. have long been specialists in hand forging the wrought iron chain used in our Sterling Sling Chains. Their faithful adherence to the practices that achieve perfection in welding assures the unvarying high quality of this special type chain. All Cleveland Sterling Grade Sling Chains are certified tested before leaving the factory.

The Cleveland Chain & Mfg. Co. Cleveland, 5 Ohio

ASSOCIATES: DAVID ROUND & SON, CLEVELAND 5, OHIO • THE BRIDGEPORT CHAIN & MFG. CO., BRIDGEPORT 1, CONN. • SEATTLE CHAIN & MFG. CO., SEATTLE 8, WASH. • ROUND CALIFORNIA CHAIN CORP., LTD., SO. SAN FRANCISCO & LOS ANGELES 54, CALIF.

has been named sales promotion manager for Pemco Corp., Baltimore. He succeeds **William B. Rose** who has become associated with a Baltimore advertising agency.

—o—

Melvin C. Wilt, formerly executive vice president and general manager of Curtis Lighting Inc., Chicago, has been elected president of the company, marking the first time that the presidency has been held by any one other than a member of the Curtis family. Mr. Wilt succeeds **Darwin Curtis** who has become chairman of the board of directors. **Kenneth Curtis,** formerly board chairman, has become chairman of the company's advisory committee.

—o—

A. J. Williamson, for seven years chief metallurgist for Summerill Tubing Co., Bridgeport, Pa., has been named plant manager.

—o—

P. A. Alers, who has been associated with Worthington Pump & Machinery Corp., Harrison, N. J., since 1933, has been appointed manager of the company's office at El Paso, Tex., and **Andrew S. Ormsby,** formerly in charge of industrial relations for Bendix Aviation Corp., Detroit, has been appointed by the Worthington company as director of industrial relations.

—o—

O'Roland Read, formerly with American Type Founders Inc., Newark, N. J., and Read Machinery Co., York, Pa., has been appointed director of sales of Speedways Conveyors Inc., Buffalo.

—o—

Dr. Sanford A. Moss, consulting engineer of General Electric Co., Schenectady N. Y., and inventor, has been awarded the Howard N. Potts Gold Medal of the Franklin Institute, Philadelphia, "in consideration of the extreme value of his work in making a turbo-supercharger a successful and reliable part of an internal combustion engine."

—o—

L. E. Lynde has been appointed manager of the New England district of Westinghouse Electric Corp., Pittsburgh, and will have his headquarters in Boston. Mr. Lynde, who has been manager of the Central Station, Transportation & Marine Division of the company's New England district, succeeds **F. L. Nason,** who has become a special representative of the company in the New England district. Mr. Lynde has appointed **Sidney C. Palmer** as Transportation & Marine Division manager and **F. S. Bacon** as Central Station manager for the district.

—o—

Frank J. Kohut has been promoted from sales-engineering supervisor to sales manager of the C. M. Kemp Mfg. Co., Baltimore.

—o—

James M. Bovard, Pittsburgh attorney who recently returned from Army service, has been elected to the board of directors of the Scaife Co., Oakmont, Pa. Other appointments are: **John Hopkins,** vice president in charge of operations; **John T. Stuart,** secretary-treasurer; **F. C. Campbell Jr.,** assistant secretary; and **J. J. Dorn,** general superintendent.

—o—

Champ Carry, executive vice president of the Pullman Co. since 1941, has been elected president of the Pullman-Standard Car Mfg. Co. He succeeds **C. A. Liddle,** who was elected chairman of the board of Pullman-Standard. Mr. Carry has resigned as director and vice president of the Pullman Co., sleeping car operating subsidiary of Pullman Inc., to accept the presidency and a directorship of the car manufacturing subsidiary. He will continue as a director of Pullman Inc.

—o—

Walter B. Scott, an industrial engineer and until recently associated with J. I. Case Co., Racine, Wis., has joined Maguire Industries Inc., Bridgeport, Conn., as an assistant to **Paul K. Povlsen,** vice president and general manager.

—o—

E. S. Avery has been placed in charge of a factory branch in Chicago which has been opened recently by Waltham Grinding Wheel Co., Waltham, Mass. Mr. Avery will supervise distribution of the company's products in Illinois, Indiana, Wisconsin, Minnesota, Missouri and western Michigan.

—o—

Sir John Henry Maitland Greenly, chairman, Babcock & Wilcox Ltd., London, England, has been presented the platinum medal for 1946 by the British Institute of Metals, in recognition of his outstanding services to the nonferrous metals industry.

—o—

Allen Aikens has resigned as sales representative of the Dockson Corp., Detroit, to assume active management of the Red Head Products Co., Royal Oak, Mich. That company, formerly known as the Rich Red Head Rivet Set Division, Mott Steel Products Corp., was purchased by Mr. Aikens recently.

—o—

Dewey Williams has been appointed sales manager, Gordon Lubricating Co., Pittsburgh. Since 1939 Mr. Williams has been chief lubricating and combustion engineer for the Pittsburgh, Charleston, W. Va., and Buffalo areas, Cities Service Oil Co.

—o—

Roland C. Disney has been appointed manager of the eastern district, Baldwin Locomotive Works, Philadelphia, and will have offices in that city. Prior to service with the Army, Mr. Disney served for 11 years in the engineering department, Western Electric Co.

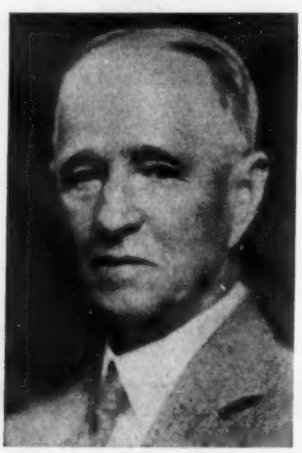
—o—

Irwin A. Rose, vice president in charge of manufacturing, Edison General Electric Appliance Co. Inc., Chicago, has taken a similar position with the Maytag Co., Newton, Iowa. **H. E. Kenitz,** general superintendent for the Edison company, has been appointed manager of manufacturing and will have complete charge of all of the Edison company's manufacturing operations.

—o—

S. A. Cogsdill, who founded the Cogsdill Twist Drill Co., Detroit, has been elected chairman of the company's directors, and **Floyd Cogsdill,** associated

E. C. BULLARD



E. P. BULLARD

Who have been elected president and chairman of the board respectively, Bullard Co., Bridgeport, Pa., and noted in STEEL, March 25 issue, p. 65

RALPH H. LIGHTNER

Who has been named general sales manager, Titan Metal Mfg. Co., Bellefonte, Pa., and noted in STEEL, April 1 issue, p. 130

GEORGE D. LAIN

Recently appointed research engineer, Committee on Steel Pipe Research, American Iron & Steel Institute, noted in STEEL, March 25 issue, p. 88

S. C. MASSARI

Who has been appointed technical consultant, American Foundrymen's Association, Chicago, noted in STEEL, April 1 issue, p. 130

with the company many years, has been elected president. **C. B. Stoerkel** has been advanced from division sales manager to sales manager.

—o—

A. A. Gustafson has been appointed sales engineer of Ajax Electric Co., Philadelphia, and will maintain offices at 2580 University Avenue, St. Paul 4, from which he will serve Minnesota, North and South Dakota, and northern Wisconsin.

—o—

Sam L. Brous has been named manager of sales development, B. F. Goodrich Chemical Co., Cleveland. **James C. Richards** has been promoted to sales manager of synthetic and reclaimed rubber.

—o—

B. F. Goodrich Co., Akron, has announced the appointment of **R. W. Smith** as manager, rubber track development and **W. F. Perkins,** manager, tire testing laboratories, Tire Division. **Kenneth R. Huffman** has been named auditor of interplant operations and **George H. Edgar,** manager, raw materials and processing costs department.

—o—

Bernie G. Silberstein, manager of the Ilg Electric Ventilating Co. branch office in Cincinnati, has been appointed Ohio valley district manager to supervise engineering and sales activities of the company's offices in Cincinnati, Columbus, O., Louisville, Knoxville, Tenn., and Charleston, W. Va.

—o—

Samuel D. Conant has been named district sales representative for upper New York state for the Putnam Tool Co., Detroit, and he will have offices in Rochester, N. Y. Since 1936, Mr. Conant had been associated with the Greenfield Tap & Die Corp., Greenfield, Mass., except for 2 years when he was with the Cutting Tool Section of WPB.

OBITUARIES . . .

Lee A. Daines, 52, vice president and general sales manager, Heppenstall Co., Pittsburgh, died in Miami, Fla., March 29. Mr. Daines joined Heppenstall Co. in 1923, and in May, 1945, was elected a vice president. He had been a director of the company 8 years.

—o—

Ernest R. McKnight, 51, traffic manager, Austin-Western Co., Aurora, Ill., died March 29 in that city. He had been associated with the road building machinery company 30 years.

—o—

Albert J. Hess, 72, who retired in 1943 as manager, Cold Rolled Strip Steel Division, Chicago, American Steel & Wire Co., died recently in Oak Park, Ill. He had been associated with the company 53 years.

—o—

Andrew Meurer, 81, retired secretary, Meurer Steel Barrel Co., Newark, N. J., died recently.

—o—

William P. Rand, 67, structural engineer with Wilbur Watson & Associates, Cleveland, died recently at his home in South Euclid, O.

—o—

Daniel Roby Payne, 67, consulting engineer, died recently in New York. Mr. Payne was co-owner of the New York Switch & Crossing Co., Weehawken, N. J.

—o—

Bengt Erik Folke, 42, an inventor of locomotive appliances, died March 23 in Port Chester, N. Y. Mr. Folke was chief mechanical engineer and a director, Nathan Mfg. Co., New York, and a vice president and director, Nathan Aircraft Devices Corp., New York.

—o—

Robert W. Henke, 49, Cincinnati district manager, Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford, Conn., died March 31 in Cincinnati.

—o—

Edward J. Finkbeiner, 60, vice president, American Car & Foundry Co., New York, died March 23 at his home in East Orange, N. J. He had been with the company 42 years, starting as an auditing clerk.

—o—

Clayton A. Nenno, 58, who resigned 3 years ago as executive vice president, J. M. & L. A. Osborn Co., Cleveland, died recently at Miami Beach, Fla.

—o—

Arthur William Nash, 74, retired steel construction contractor, died recently in Los Angeles.

—o—

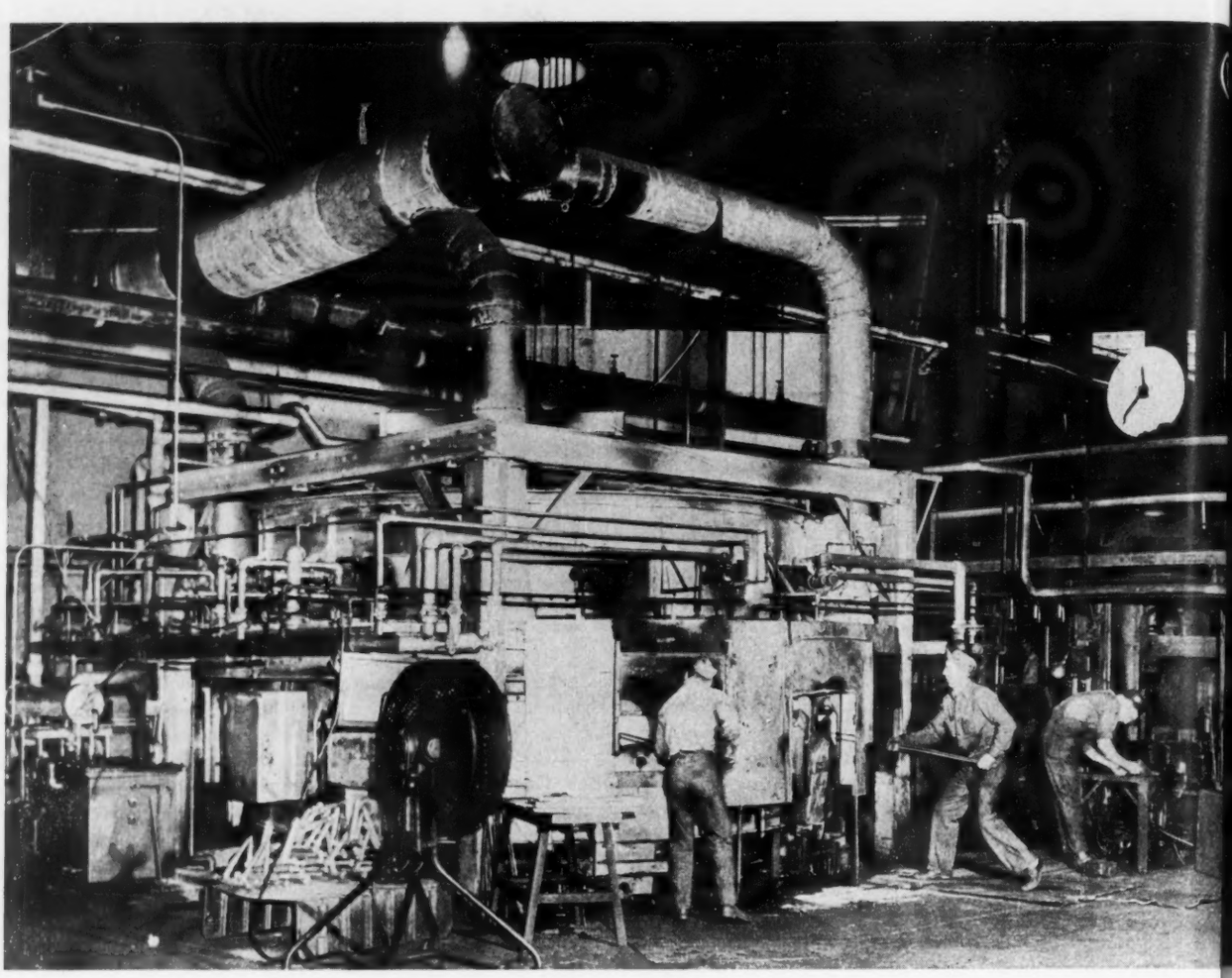
Frank J. McCulloch, 55, assistant treasurer, Air Reduction Sales Co., New York, died March 29 at Mt. Vernon, N. Y.

—o—

Ralph W. Deacon, 66, former works manager at Carteret, N. J., United States Metals Refining Co., New York, died recently at his home in Elizabeth, N. J.

—o—

Maurice D. Langhorne, 67, general superintendent, E. J. Lavino & Co., Philadelphia, died recently in Lynchburg, Va. Mr. Langhorne had been associated with the Lavino company 27 years.



Precision "Atmosphere" Forging

Many peacetime applications are seen for atmosphere heating in the forging of thin steel parts where freedom from scaling, surface irregularities, decarburization and forming to precise dimensions are advantageous

By E. G. de CORIOLIS
Director of Research and Development
Surface Combustion Corp.
Toledo, O.

WHILE the high-production manufacture of propeller blades may at first seem to bear little relationship to the fabrication of civilian goods, of the many processes developed primarily for war purposes, that of the atmosphere heating for forging of pieces comprising the blades made by A. O. Smith Corp., Milwaukee, possesses distinct possibilities for the fabrication of peacetime products.

Where freedom from scaling, surface irregularities, decarburization, and forming to precise dimensions are advantageous in the forging of thin section steel parts, especially if they must be repeatedly heated and cooled, the methods developed by this company for propeller blade parts may materially reduce the number of operations required and decrease the amount of waste material, while producing a more uniform and reliable product.

To familiarize those not now acquainted with the Smith propeller blade, it is shown before and after welding into a unit in Fig. 3. In Fig. 4 a cross-section of the four parts of the center section of the blade are shown. One of the plates in the center section is illustrated in Fig. 5, while the successive steps in forging the trailing edge of the blade from round bar stock are shown in Fig. 6.

Throughout the series of repeated heating and forming operations required for the various pieces, the tolerances as to thickness and weight of each piece were far closer than ever specified prior to the war, so far as is known. Each piece was separately weighed before assembly. Permissible variations in thickness were but a few thousandths

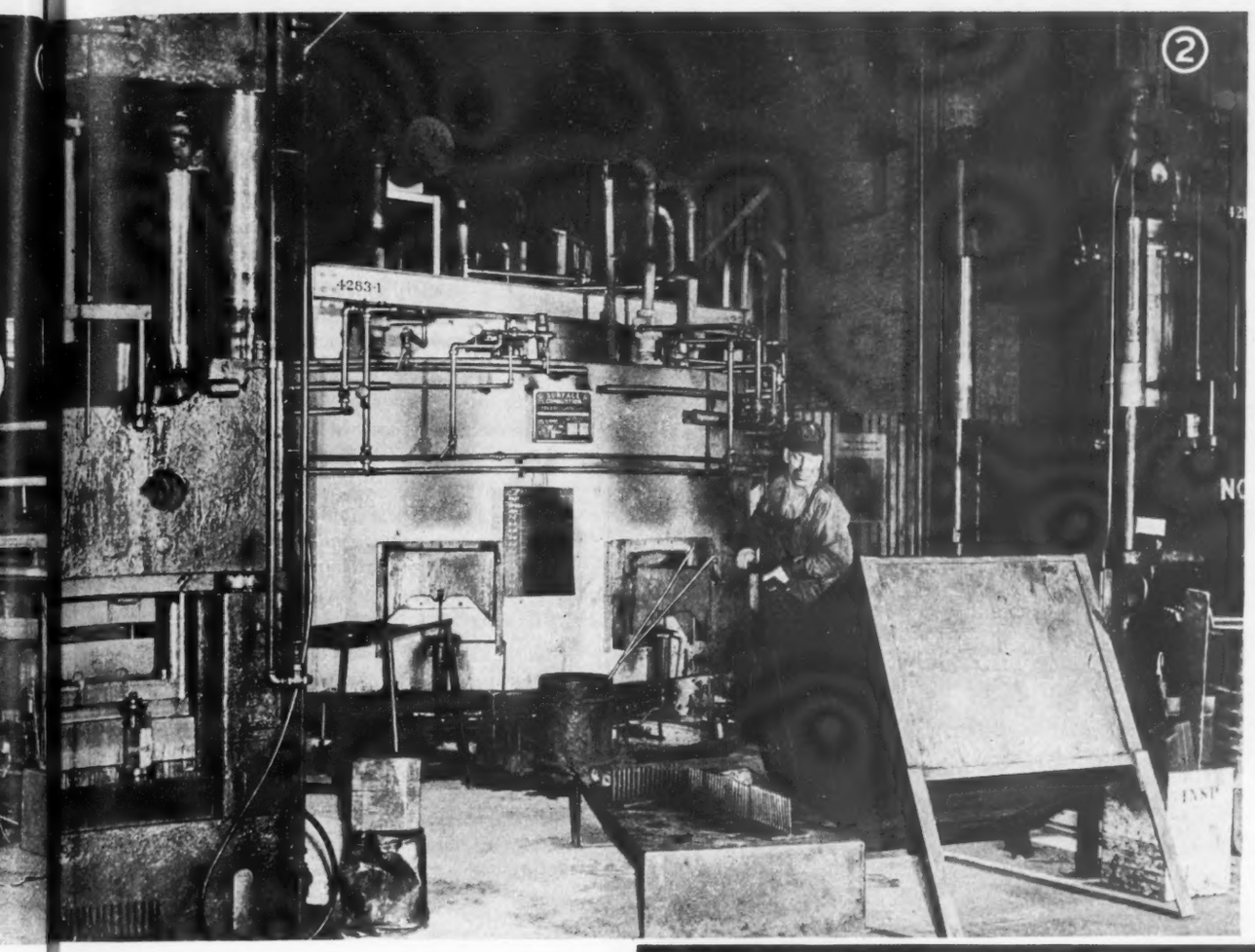
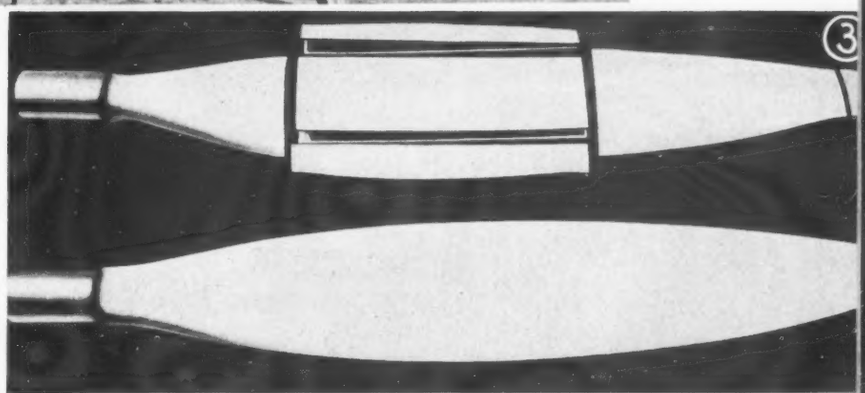


Fig. 1—The plates are fed from the furnace shown here to the rolling mill at right, where the complete pattern (not just the contour) of the piece is formed. Capacity 120 to 130 pieces per hour

Fig. 2—Surface Combustion radiant tube low door rotary furnace feeding two hydraulic presses (at each side). Presses receive pieces at 1650° F where they are held in hot dies for 1½ min. Furnace is fed from loading box that is constructed of insulating material



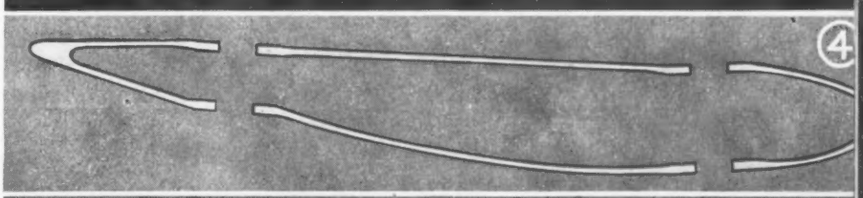


Fig. 3—Seven pieces are assembled by flash welding to form the Smithway hollow propeller blade. Components of blade are formed from tube, bar and plate stock

Fig. 4—Transverse view of the four pieces forming the center section of the blade. Notice that the edges of each piece are slightly thickened to increase the strength at the welded joints

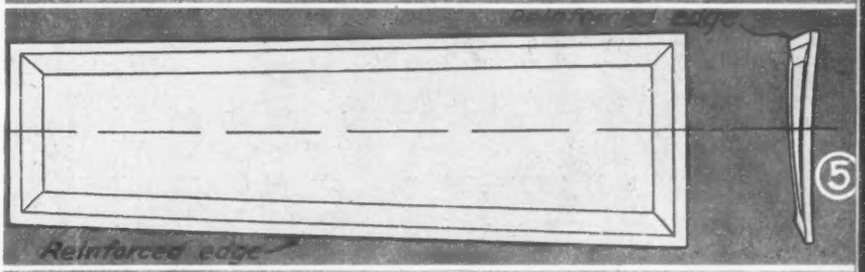
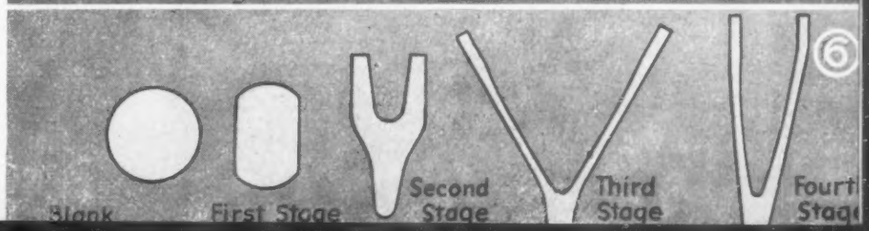


Fig. 5—Drawing of one of the two center section plates. The plates are tapered in thickness toward the tip of the blade (wide end of plate)

Fig. 6—The trailing edge pieces are forged from blanks of round bar stock in four successive stages



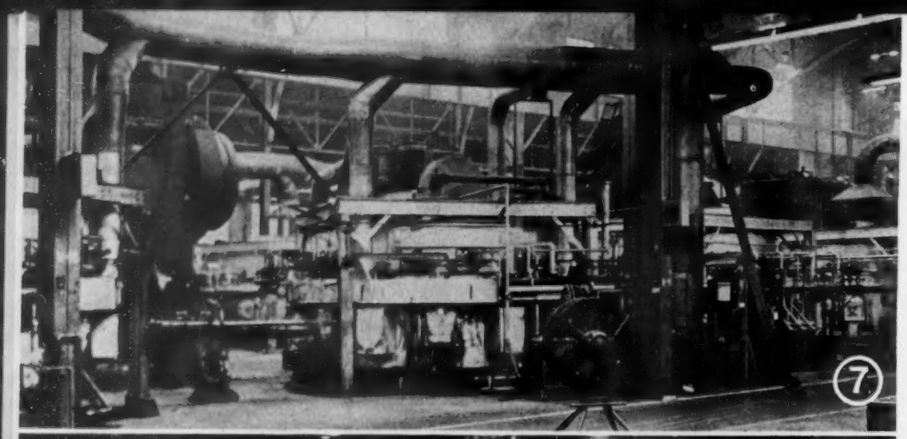


Fig 7—Two furnaces with mechanical manipulator are used to supply the press used for coining edges of large tip of the blade

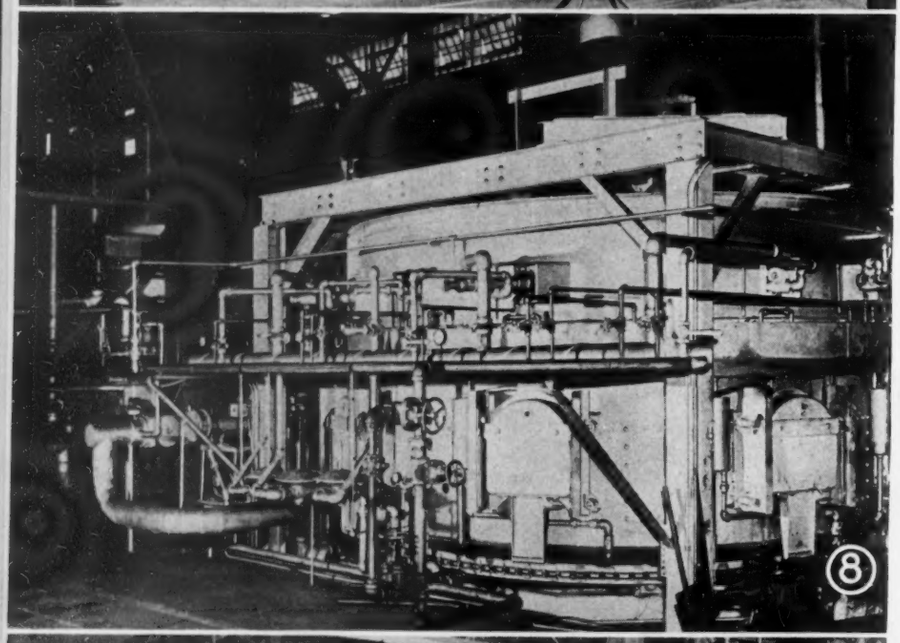


Fig. 8—Close up of one of typical 8-hole rotary furnaces that are used for coining and other operations

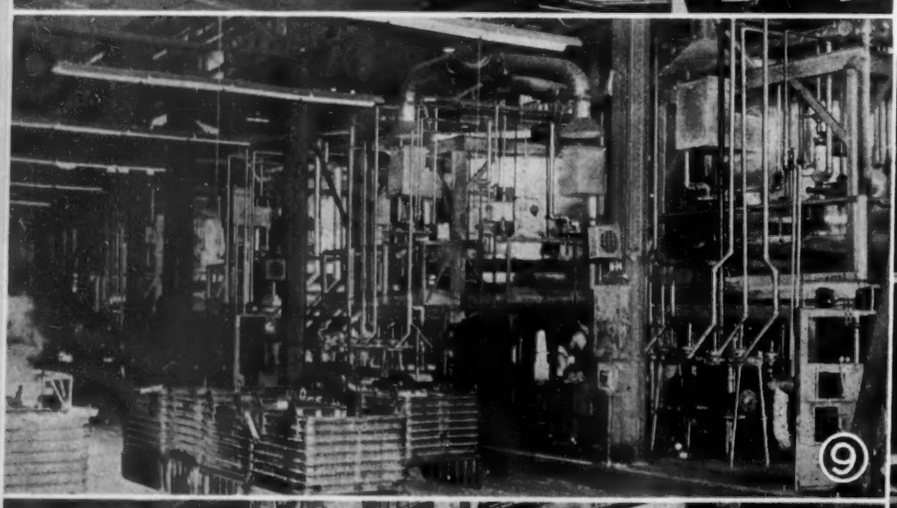


Fig. 9—Battery of vertical furnaces used in forming large tip part of blade. Salt dip baths shown at left

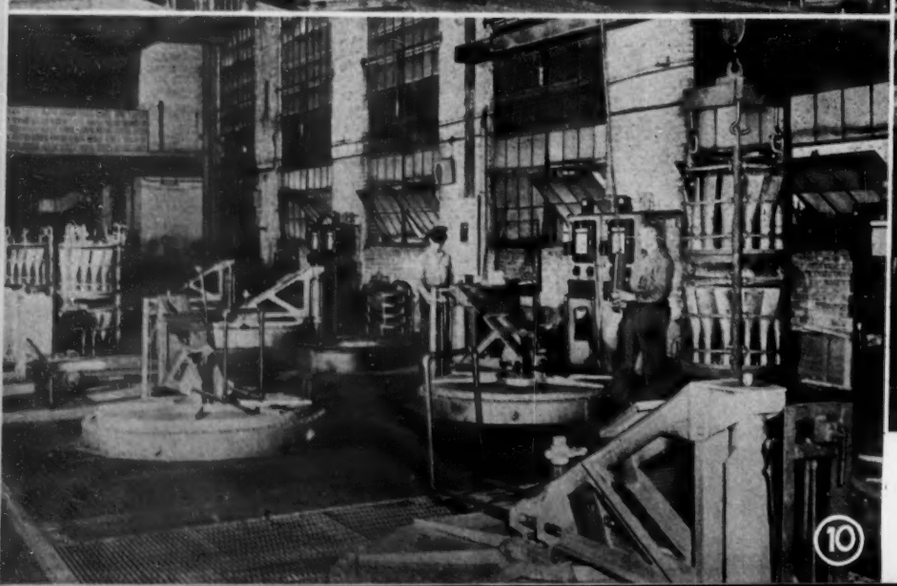
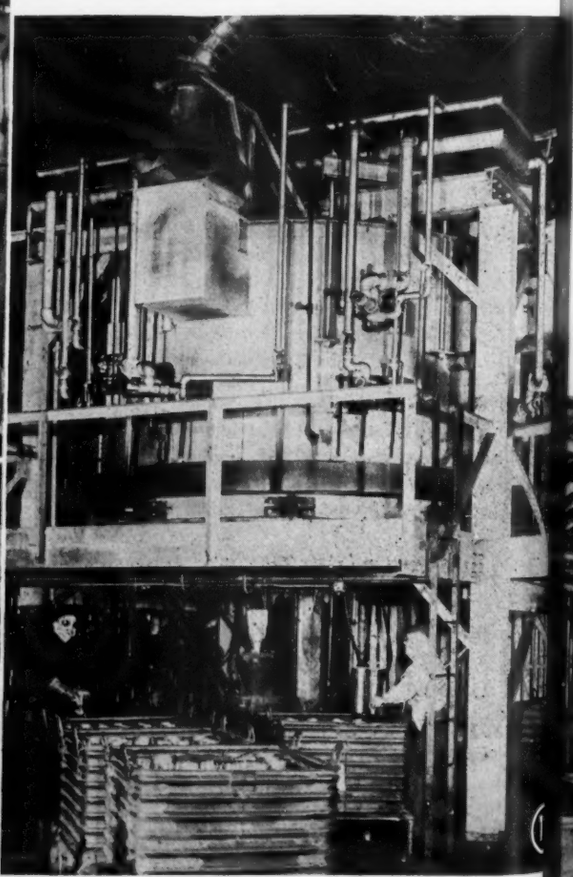


Fig. 10—Battery of pit-type radiant tube normalizing furnaces operating at 1650-1700° F for general normalizing

Fig. 11—Vertical furnace used in heating the cone shank section for preliminary and final forming (flattening) on press located at left (not shown)

Fig. 12—Basement view of pit furnaces used for normalizing. Notice accessible location and general "cleanliness" of installation, for ease of maintenance

Fig 13—Battery of 13 NX (nitrogen) gas generators supplying atmosphere for all forging operations. Total capacity 96,000 cu ft of gas per hr with one generator off line for cleaning



(tolerances reduced as production methods were progressively improved during the war), since accumulated differences would have a pronounced effect upon the weight and uniformity of the assembly. Hence, the removal of any material amounts of stock to restore the surface for later forging operations could not be tolerated. Freedom from scaling was also important due to its effect upon the life of the dies used in the forging operations. In fact this proved to be one of the greatest benefits derived from the forging procedure adopted.

While certain information relating to the exact nature and sequence of forming operations employed in fabricating the blade components must continue to be withheld, information can now be published relative to the application of controlled atmospheres to the forging of the parts which will indicate clearly how this process may be applied for other purposes.

Flexibility Permits Changes

The flexibility of the process readily permitted changes in blade size and contour, thus affording an opportunity to alter the blades to suit various sizes of engines and comply with contour modifications resulting from aerodynamic developments during the war period. A typical blade consisted of seven individual pieces as shown in Fig. 3. Some 65 hot forming operations were required on each blade assembly, each piece passing through several operations and heat treatments before assembly by fusion welding into the complete blade, (see accompanying table). The steel was SAE-4340 (chromium-nickel-molybdenum). Hence, the importance of controlling the characteristics of the material throughout the entire process.

When the process was first developed and applied, the tolerances of thickness of material were held to 0.010-in. Later this was reduced to 0.005 for most pieces. This reduction was obtained by better control of decarburization, since with such a rigid tolerance it is not possible to grind off any decarburized surfaces. With either the original 0.010-in. or the later reduced tolerance, oxidation had to be minimized during the heating cycles to prevent such decreases in thickness as would cause rejection.

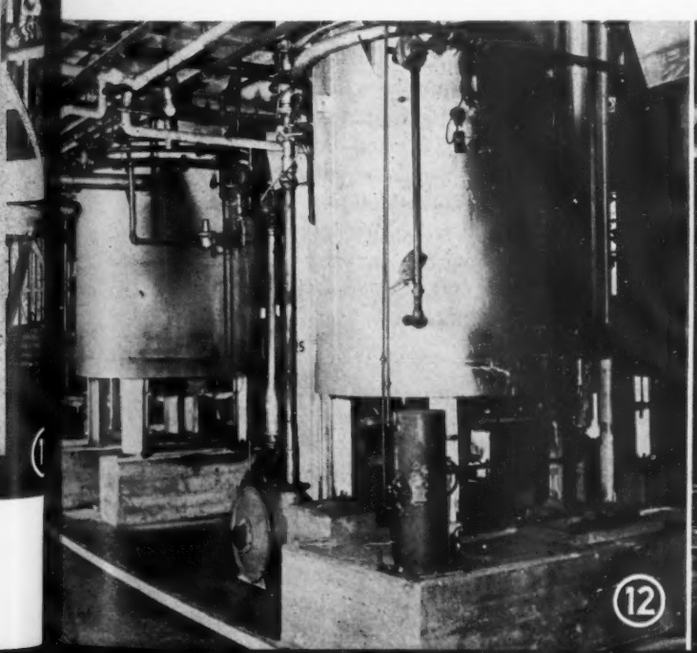
For each forging operation each piece was heated in an NX or nitrogen atmosphere to a temperature ranging from 2250 to 2400° F depending upon the mass and form of the pieces (Figs. 3 and 5). It was then quickly removed from the furnace, placed in a press and struck one blow only. For some of the pieces one blow was sufficient to obtain the desired form. For others the pieces were heated as many as 4 or 5 times, but in each instance only one blow of the press was given the pieces between each heat. After each forming operation the piece was cleaned. Final and some intermediate grinding was originally required, but wire brushing or blasting was usually sufficient, and as noted previously, the amount of grinding was minimized when tolerances were reduced.

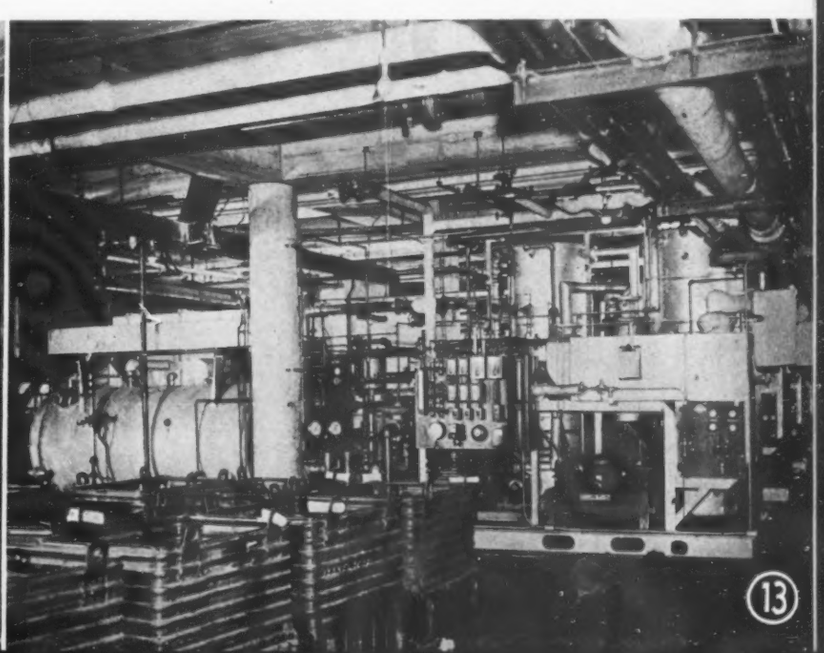
Contrary perhaps to general impressions concerning how the blades were produced, none of the pieces was cut from sheets and tapered by machining, but all were formed by forging or similar process, including the tapering in thickness of the pieces from the root or hub end

First Full Report

While some information concerning the manufacture of Smithway hollow steel propeller blades appeared in an article by Herbert Chase in WINGS for February, 1944, this is the first disclosure of the methods used in atmosphere heating the parts of the blade for forging in which numerous problems were overcome in preventing scaling and retaining closer tolerances demanded. The article in WINGS described the general form of the parts constituting the completed blade, the forming of the tubular blade root section and some of the finishing methods following the assembly of the blade by welding. This article deals with the manner in which the plates, tips, etc. are produced.

The Smithway blade, assembled as it is from seven or more pieces, (depending upon blade size and type) utilizes a forming procedure which is essentially different from that used by other propeller manufacturers. All welds are on the face or back (contoured) surface, whereas by other methods two pieces constitute the face and back and these are welded together at their edges. Figs. 3, 4, 5 and 6 are courtesy WINGS, published under the sponsorship of the Navy Bureau of Aeronautics and the Army Air Forces by McGraw-Hill Publishing Co.





to the tip. Definite control of the thickness of the metal was of paramount importance not only from the standpoint of weight, but of overall strength to withstand the variable stresses to which propeller blades are subjected. Tube sections and slugs or small slabs are used for some pieces, the tubing for the section of the blade nearest the hub and the slug for the cap or tip (Fig. 9). The thin sections of the blade when not initially of tubing were rolled to desired preliminary thickness from bar and strip stock. The thickness of the "plate" sections of the blade ranged somewhat above and below ¼-in. depending upon location in the blade assembly. The initial size of the tube for the shank of the blade was approximately 5-in. OD, and ⅜-in. thick (Fig. 11). It was first taper formed, then flattened at one end to conform with the contour of the next section of the blade. Tapering as well as contour forming (die-quenching) operations were performed under atmosphere. Contour dies were steam cooled in later production.

For the production of the nitrogen atmosphere, 13 Surface Combustion NX Type (8000 cu ft per hr) atmosphere generators were used (Figs. 13, 14 and 15). Since 12 were needed for the production of the 96,000 cu ft established as necessary for maximum production of blade pieces, one generator was allowed on down-time for cleaning and maintenance. Installation of additional generators to increase gas production to 104,000 and later possibly to 150,000 cu ft was planned just before the end of the war.

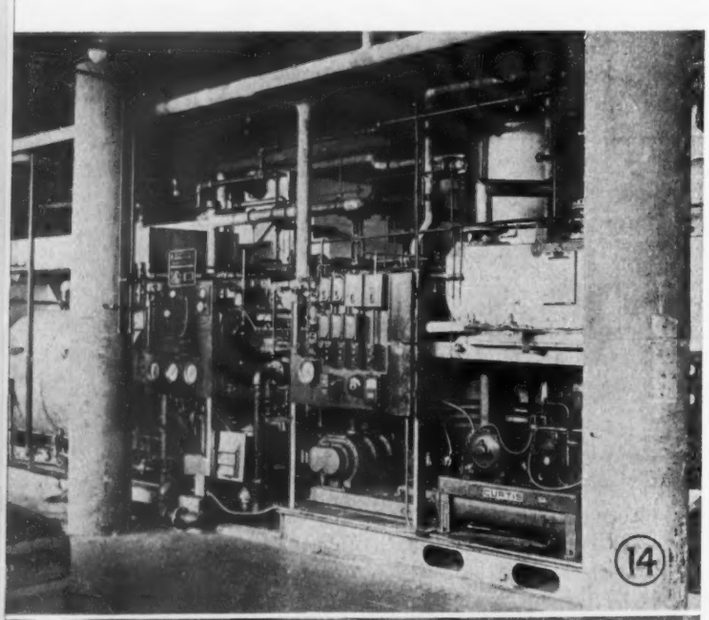
TABLE I

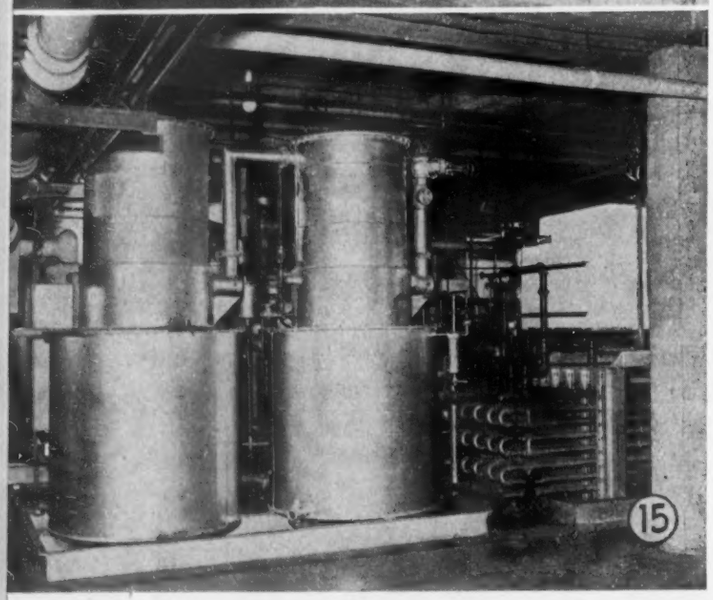
As an example of the forging operations required in forming various parts of the blade, the following sequence for the large tip is typical.

Following electro-forming in a special machine—

1. Hot forge after heating in atmosphere vertical furnace.
2. Bead coin (hot), horizontal manipulator (Fig. 7 & 8).
3. Finish forging.
4. Hot flattening (a) and (b), two heats in atmosphere furnace.
5. Final hold and simultaneously normalize in hydro press from 1800° F, ½-min in press. (All other parts except tip are normalized in pit furnaces, Fig. 11).

Each piece was originally grit blasted between each of the hot operations given above. Later it was found that some of these blasts could be eliminated due to freedom from scale resulting from atmosphere forging.





While it was originally expected that nitrogen gas used alone would both eliminate scaling and prevent surface decarburization, it was soon found that control of the latter was insufficient, and a modification of the gas was therefore necessary. The addition of about 1.25 per cent of natural gas added to the retorts in the furnaces proved quite successful in preventing decarburization.

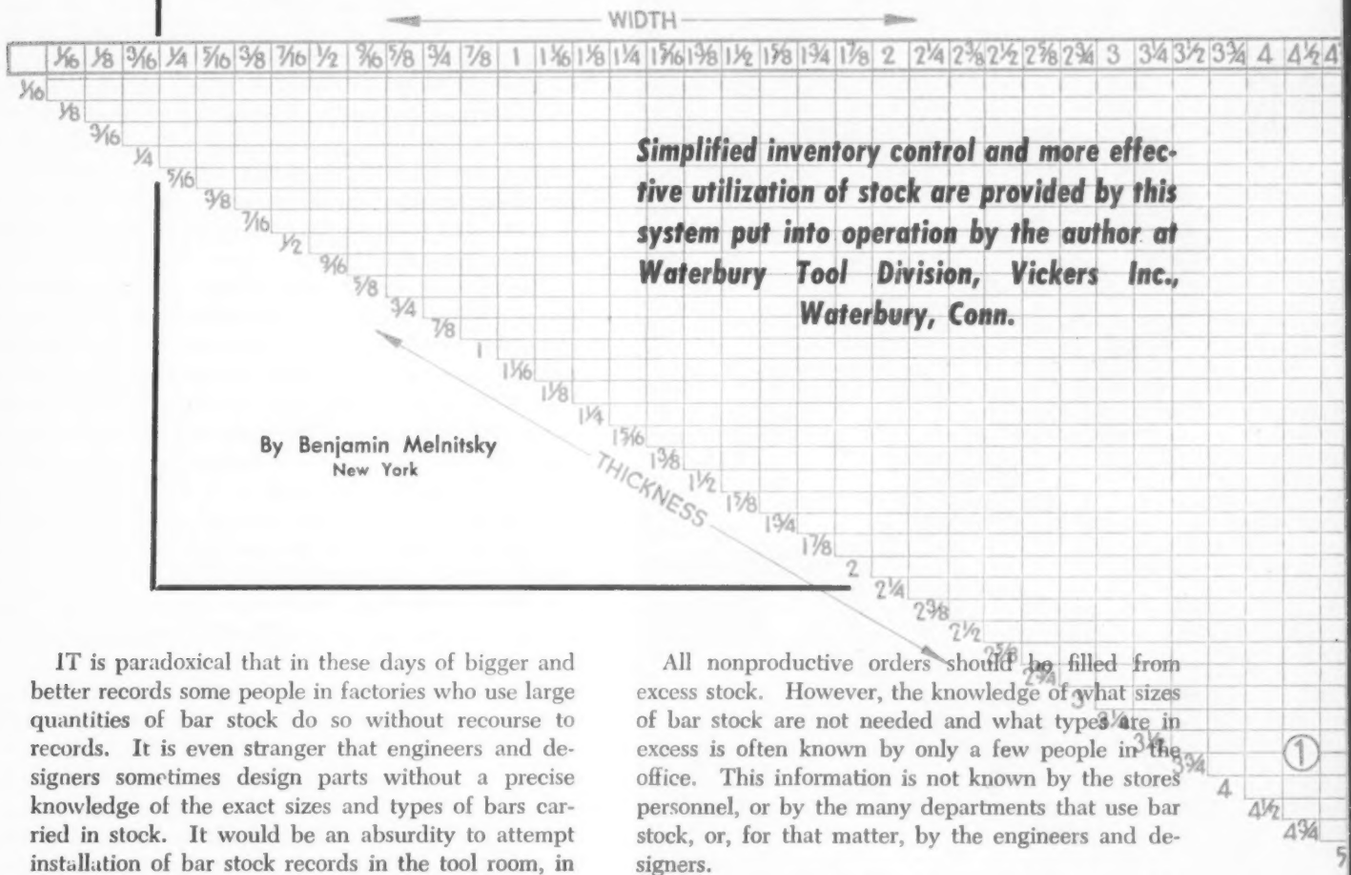
Radiant tube type furnaces were used for heat-treating operations. On the rolling mill furnaces which were used for heating the face and camber plates of the blades for rolling, the total decarburization with the straight NX gas ran as high as 0.015 to 0.020. With natural gas enrichment, this was reduced to 0.003 to 0.005. This was considered remarkable when pieces were heated as many times as four or more.

The application of "atmosphere forging" of course is not limited to forming parts from alloy steels. Nor is it essential that the process be applied only where the pieces are to be heated and cooled as many times as in fabricating propeller blades. Where high production of forgings to precise tolerances and with least loss of material from surface defects and reduction in subsequent machining operations can reduce cost, the use of the atmosphere method is a distinct advantage.

Fig. 14—Close-up of control panel side of one of NX, 8000 cu ft per hr generators located in basement

Fig. 15—Rear view of atmosphere generator line showing absorption towers and heat exchanger

Bar Stock Records



Simplified inventory control and more effective utilization of stock are provided by this system put into operation by the author at Waterbury Tool Division, Vickers Inc., Waterbury, Conn.

By Benjamin Melnitsky
New York

IT is paradoxical that in these days of bigger and better records some people in factories who use large quantities of bar stock do so without recourse to records. It is even stranger that engineers and designers sometimes design parts without a precise knowledge of the exact sizes and types of bars carried in stock. It would be an absurdity to attempt installation of bar stock records in the tool room, in tool design, in the engineering and design departments, in maintenance, in the heat treat room, and in all other departments that use bar stock for productive and nonproductive purposes.

Of course, the office records are open to all who wish to use them. Theoretically, the tool room foreman could consult the records to see if a particular size he wants is in stock. Theoretically, the maintenance man could refer to the records if he wants a length of flat stock with which to brace a certain machine.

Actually, however, these departments use bar stock with no absolute knowledge of stock out in the rack. As a result, orders are often held up in the storeroom for lack of desired stock; or if the stock is delivered it is often oversize and quite often the wrong stock. Here, too, regularly issued and widely distributed charts of stock on hand could serve a useful and worthwhile purpose.

Lack of knowledge of the sizes and types carried in stock is bad enough; but even more deplorable is the fact that nonproductive orders (for laboratory, experimental or maintenance use) for bar stock often are filled with material for productive orders.

All nonproductive orders should be filled from excess stock. However, the knowledge of what sizes of bar stock are not needed and what types are in excess is often known by only a few people in the office. This information is not known by the stores personnel, or by the many departments that use bar stock, or, for that matter, by the engineers and designers.

If everyone in the shop knew exactly what metals are not wanted, steps could be taken to reduce the inventory of such metals. Often a designer could change his specifications a bit if he knew that by so doing he would be using up currently surplus stock.

Information as to nature of stock can be indicated on charts. Special symbols can be used to indicate that stock is slow-moving and that it should be used if at all possible. There should be an automatic signal telling all of the personnel concerned that this stock represents a considerable loss to the company unless used.

Briefly stated, charts are needed (1) to present the complete, overall picture of the bar stock situation and to facilitate the selection of stock for parts; (2) to offer quick means of determining substitutes that can be used when desired sizes or types are not available; (3) to clarify the relationship between various alternate steels and to aid in the full utilization of all alternate metals and sizes; (4) to aid both old and new personnel in knowing sizes and types of bar stock on hand; (5) to indicate to all depart-

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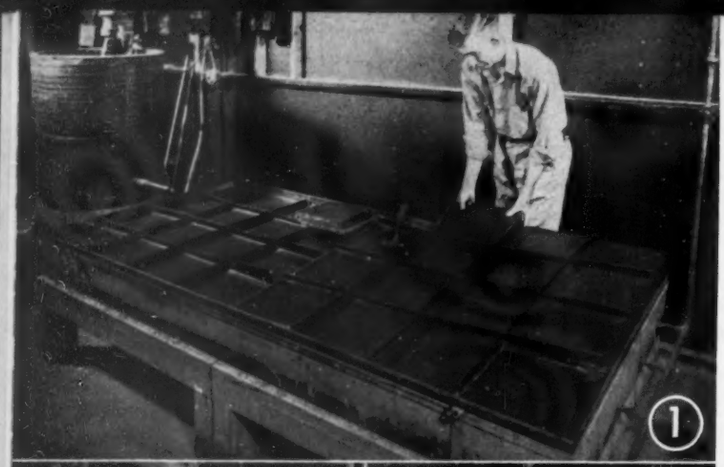
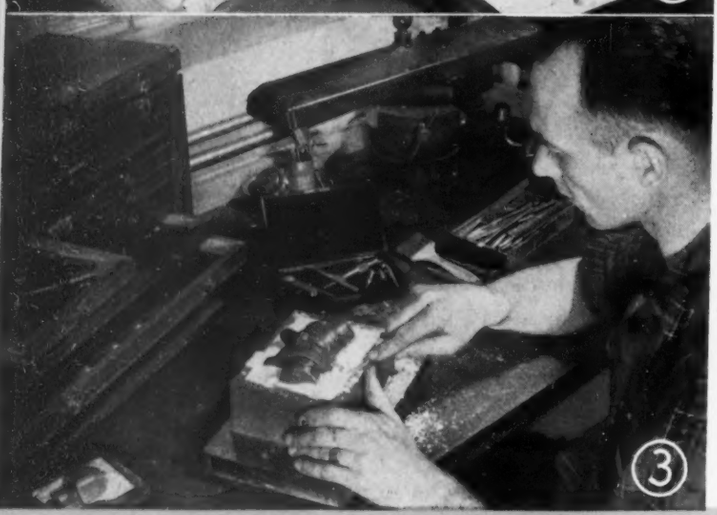




Mass Production

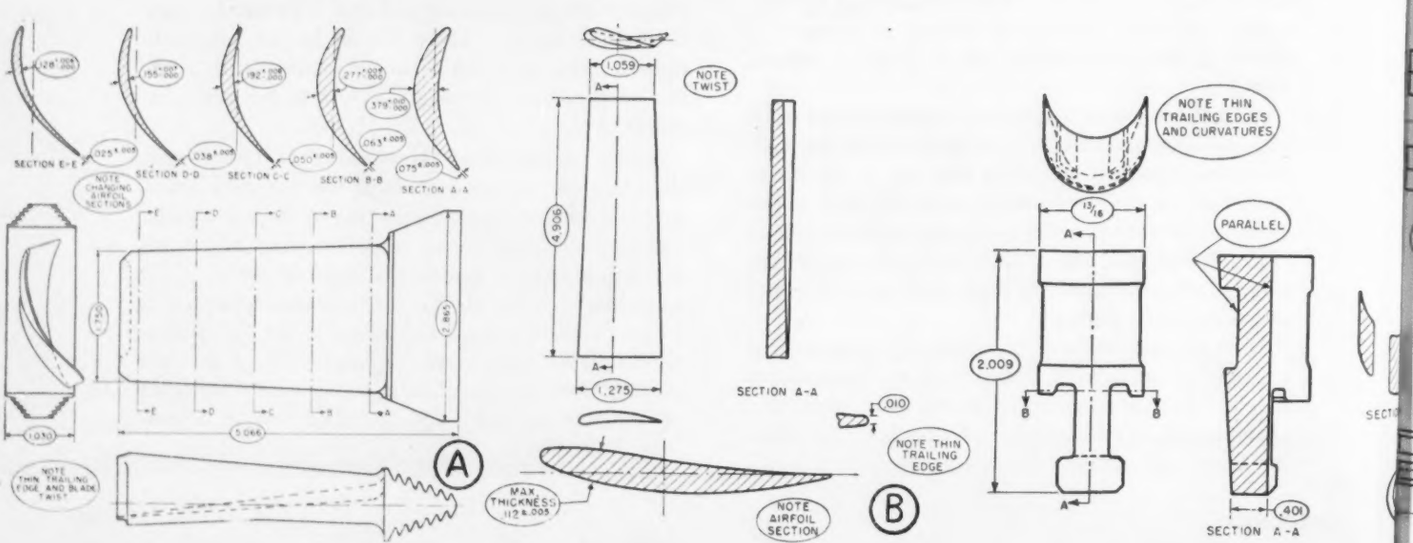
PRECISION CASTING has proved to be one of the most intriguing processes to come out of the war from the standpoint of both design and production engineers. The process, basically, is not new since it is an adaptation of the "lost wax" process familiar to the dental and jewelry trades for many years. However, the phenomenal technological advances in the process industrially become readily apparent by taking a pictorial "tour" through the plant of the Haynes Stellite Co., Kokomo, Ind., Unit of the Union Carbide & Carbon Corp., New York. No doubt, Elwood Haynes, developer of the first American gasoline automobile and inventor of the basic Haynes Stellite alloys would be astounded over the uses to which his alloys and their variations have been put.

The building now housing precision casting operations at the Haynes plant on a production line basis was not completed until December, 1945 but the company first became interested in the process for making industrial castings in 1937 and set up facilities for volume production during the war. Since 1934, the company also has cooperated with the Thomson Laboratory of the General Electric Co. in the development of high temperature alloys for turbo-supercharger buckets. The work included methods of forging and casting high temperature alloys and led to the development of No. 21 alloy (chromium-molybdenum-cobalt) for Type B turbo-supercharger buckets. This alloy is a modification of the widely known

Fig. 1—Wax for the precision casting process is blended from petroleum-base and imported natural waxes and cast into molds for remelting later

Fig. 2—From the blueprint of the part to be made, a master pattern or replica is made in brass, steel, Stellite, wood or other material, depending upon design of the part. The pattern is 1.5 per cent oversize to allow for wax and metal shrinkage

Fig. 3—Soft, tin-bismuth injection dies are prepared from the master pattern. Shown here is the first step imbedding master pattern in plaster in order to make top half of die



# of Precision Castings

Recent phenomenal technological advances in industrial precision casting practice are apparent in production-line setup of Haynes Stellite Co. at Kokomo, Ind.

Vitallium Dental alloy developed for Austenal Laboratories, Chicago and New York.

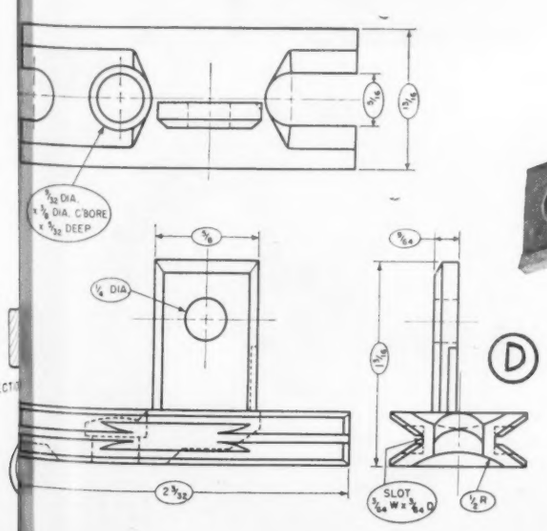
First major item produced by precision casting at the Haynes plant was the Type B bucket for General Electric, Allis-Chalmers and Ford. Early work revealed an astonishing number of problems, and at the outset shipments of good buckets could be carried out in a man's hand. However, intensive effort resulted in bringing production of these buckets up to a peak of 2,100,000 in April, 1944 and output during the war totaled some 25,000,000. Late in 1944, the Type B bucket program was cut back and three additional programs were taken on for the production of turbine blades and turning vanes for the General Electric I-40 jet engine used in the P-80 Shooting Star and Westinghouse axial flow compressor blades for jet propelled planes.

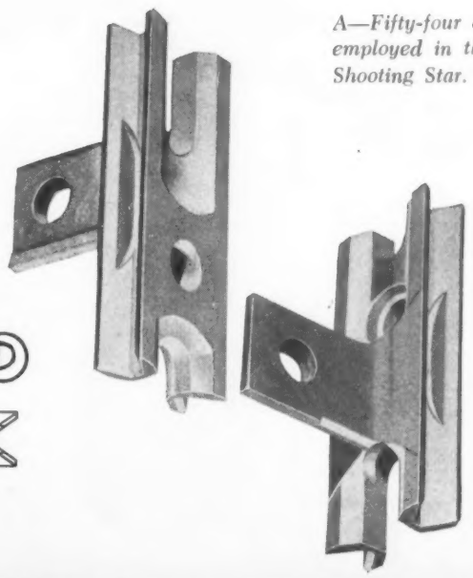
Since the close of the war, demand for precision castings has undergone additional transition. Many companies are investigating the gas turbine field and units with ratings up to 3500 hp now are undergoing tests. Gas turbines operate at red heat in the range of 1200 to 1500° F and the chief problem has been one of finding metals capable of retaining their dimensions under stress. This problem apparently is well on the way to being solved since metallurgists already are talking in terms of alloys which will perform acceptably at temperatures up to 2000° F.

Outside the high temperature field, precision cast parts

Fig. 4—Diemaker is preparing to pour the metal into the first half of the mold

Precision Casting Applications





A—Fifty-four of these precision cast turbine blades are employed in the GE I-40 jet engine used in the P-80 Shooting Star. Material is Haynes Stellite No. 21 alloy

B—Precision cast stationary blades of Type 316 stainless steel used in the Westinghouse axial flow compressor for a jet engine

C—Sketch of stationary blade of No. 21 alloy for high-temperature, high-pressure steam turbogenerator

D (left)—Drawing of cloth-cutting machine slide

D—Slide for high-speed cloth cutting machine cast in Haynes Stellite No. 6 alloy. Cost was cut 50 per cent and the part lasts three times as long as when made of tool steel

are being adapted for applications where other factors are important, such as strength, resistance to corrosion, abrasion and wear and where shapes are involved which are difficult to produce by other methods. These parts include reciprocating slides for cloth cutting machines, carburetor parts, caulks cast into aluminum shoes for racehorses, zipper slides, movie camera parts, canning machine parts, cut-off rings for glass molds, diesel engine parts, pulverizing equipment parts, rayon machine parts and the like. The part shown being made in the accompanying photographs is an exhaust coupling of Type 347 stainless steel for the Pratt & Whitney 4360 Wasp Major engine.

Largest part made so far by Haynes is a 3-lb propeller hub for the "Ercoupe" and the smallest a movie camera part, 500 of which weigh only 1-lb. Parts up to 5-lb can be made with present equipment. Parts are cast with edges as thin as 0.012-0.015-in., while maximum dimensions are approximately 7 to 8-in. It has been impracticable to hold tolerances closer than plus or minus 0.003-in.

Alloys which may be precision cast include stainless Types 310, 316, 347 and 410, Hastelloys A, B, C and D; and the Stellite alloys including the chromium-molybdenum-cobalt high temperature alloys.

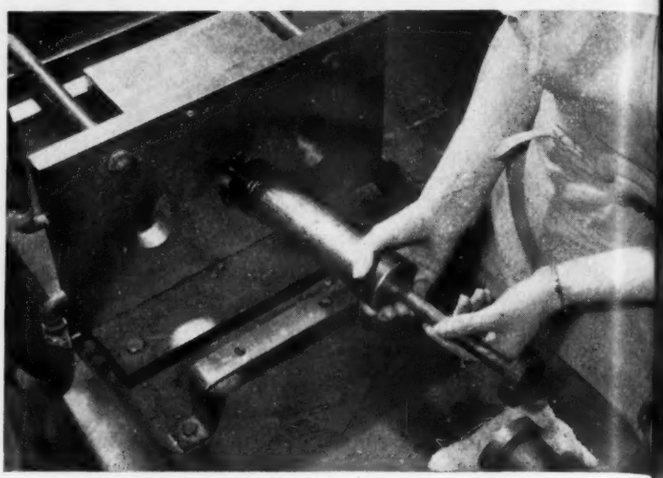


Fig. 6—After the die and necessary cores are completed, the next step is the casting of a pattern of the part in wax. This is accomplished by placing the die in the fixture shown here and injecting hot wax by means of the gun which is inserted in the die and emptied by a pneumatic ram. Not shown is the wax melting pot at left

Fig. 5—When one-half of the die has been completed, the plaster is removed and the second half poured

Fig. 7—Wax pattern then is removed from the die and cores also are removed. The wax gate is broken off by hand. This pattern is for a Pratt & Whitney engine exhaust coupling made of Type 347 stainless steel

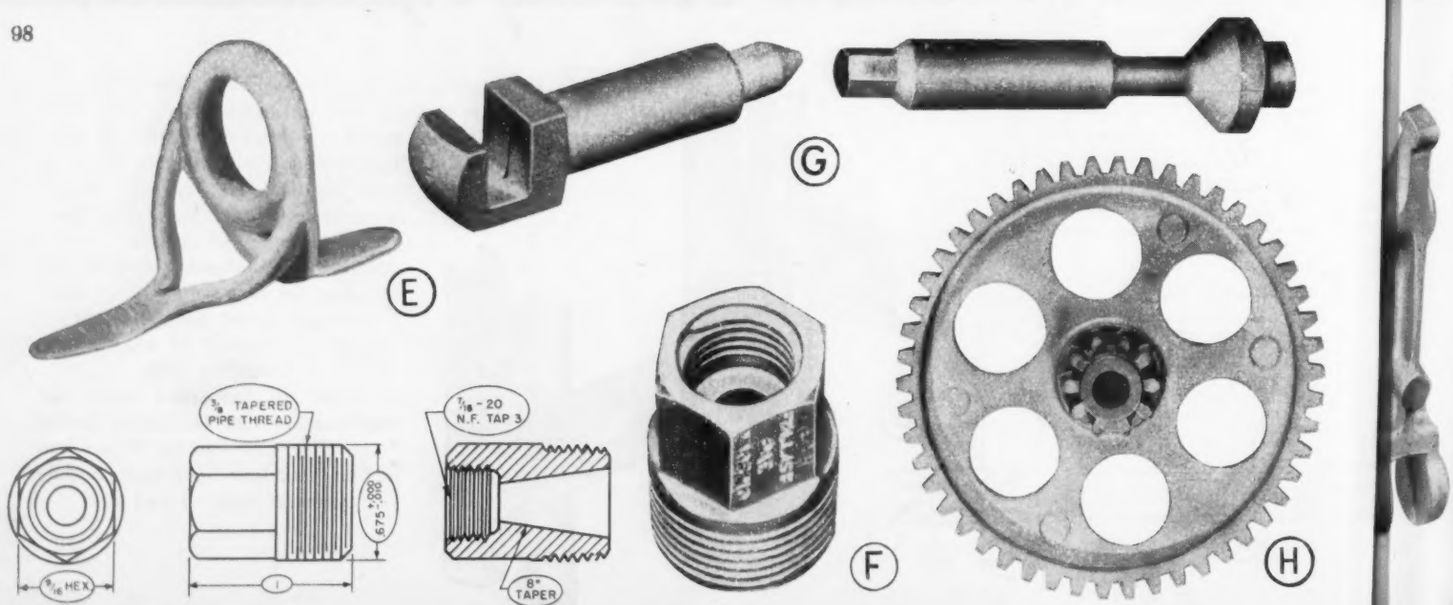


Fig. 8—In the assembly line of the wax department, operators inspect the patterns as they move by on a conveyor belt. The patterns then are assembled to gates and risers by "wax welding" and mounted on wax hubs molded especially for the purpose

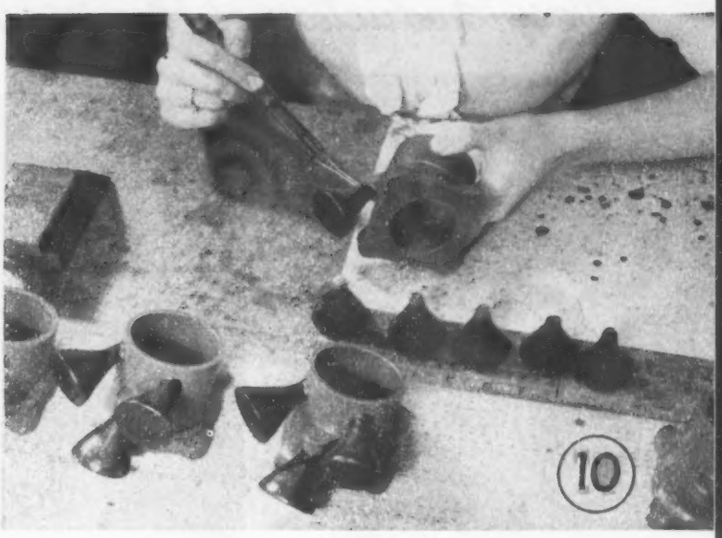


Fig. 10—This operator is welding blind risers to the wax patterns. Such risers provide assurance that the metal reaches all parts of the mold and take care of shrinkage

Fig. 9—This assembly line operator is checking the wax pattern for dimensional accuracy

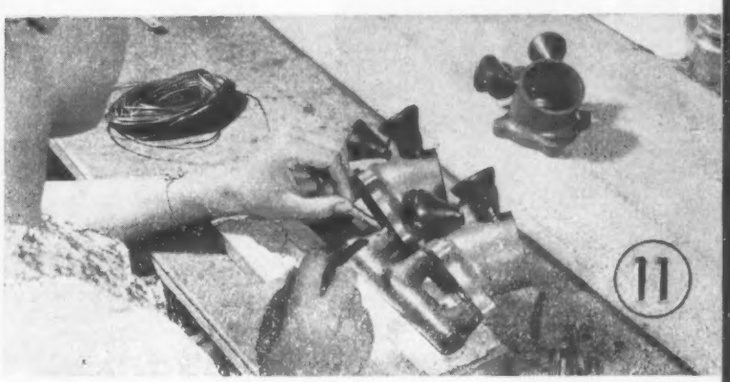
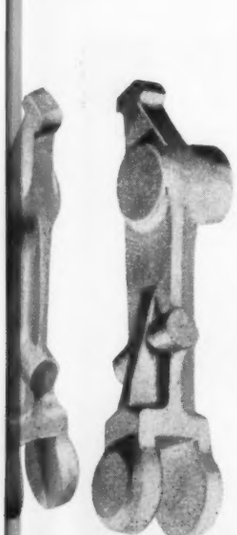
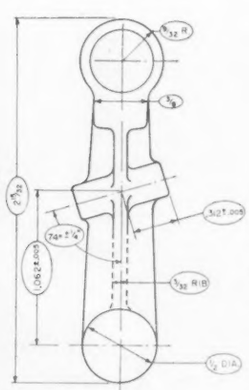
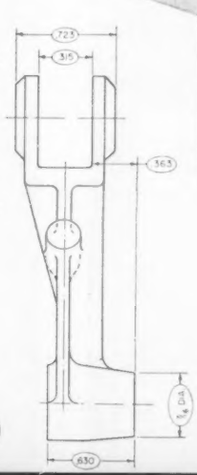


Fig. 11—Two patterns with risers attached are being mounted on main gate with runners

Precision Casting Applications







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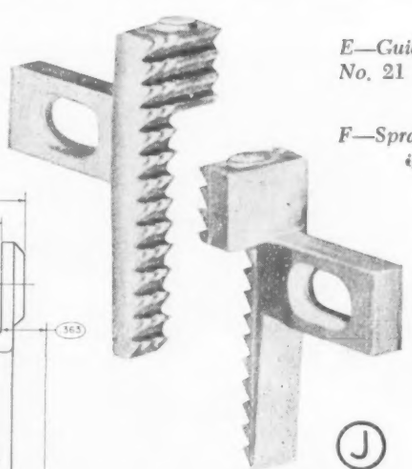


(J)

E—Guide for fishing pole precision cast of No. 21 alloy. Inside diameter may be finished to high polish

F—Spray nozzle parts of Hastelloy C are used in manufacture of high explosives

F (left)—Sketch of spray nozzle part

G—Valve parts: At left for airplane fuel tank; at right, for petroleum refinery work. Both are of Star-J Metal

H—Precision cast gear of Hastelloy C used in steel mill pickling tank

I—Crank for camera made of stainless Type 410

I (right)—Drawing of camera crank

J—Feed dogs for industrial sewing machine cast of Star-J Metal

Mass Production of Precision Castings

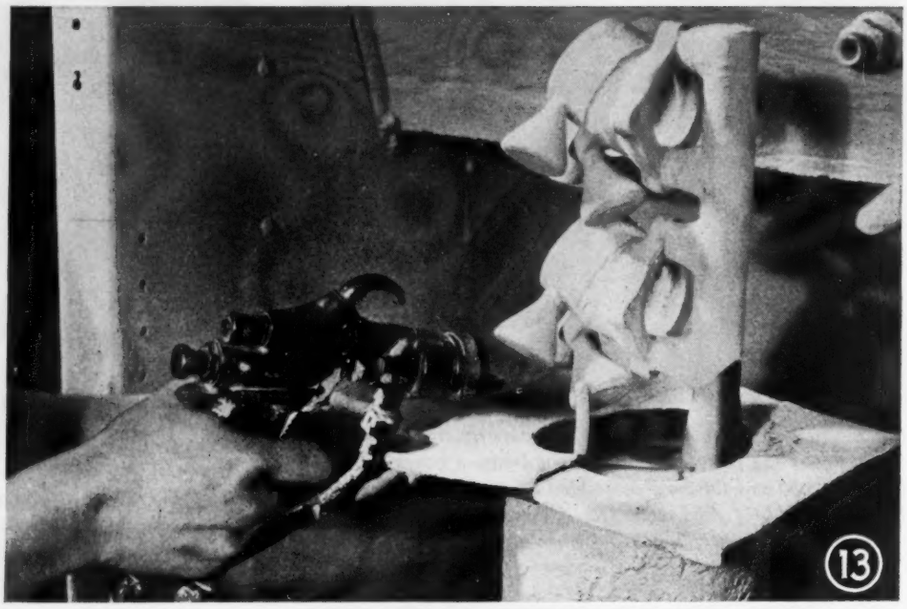


Fig. 12—The entire assembly then is dipped into a very fine silica suspended in a suitable medium. Presence of this fine material next to the wax is responsible for the smooth finish of the castings. After the wax is melted out, the fine surface of the silica will be adjusted to the molten metal

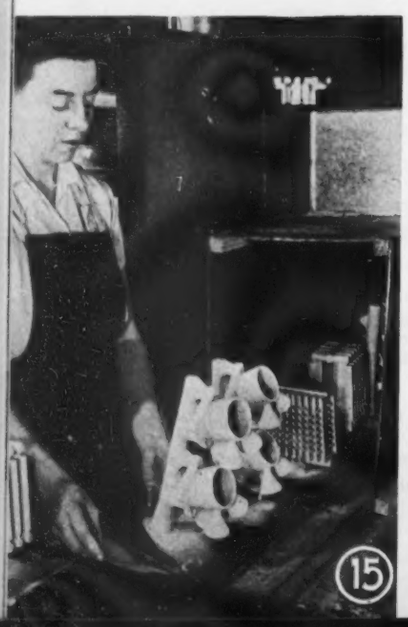
Fig. 13—After the dipping operation, the pouring end of the wax assembly is mounted on a square steel base. The area not coated by the dipping process then is sprayed with silica

Fig. 14—Coarser material then is screened or "stuccoed" on the fine silica coating

Fig. 15—The assembly with its "stuccoed" coating next is placed in a conveyorized drying oven or tunnel and, in 22 minutes, is ready for the next step

Fig. 16—After drying, a cylindrical Hastelloy C flask, coated with wax paper, is placed around the assembly and sealed with wax to the steel plate in order to make it liquid tight. The wax paper roll is longer than the flask to hold surplus investment material that is later cut off

Fig. 17—The flask containing the wax assembly then is carried to the next department on an overhead hanger-conveyor where it is filled with a chemically-hardening investment material. This material, comprising tetraethyl silicate, crushed firebrick, silica sand and alcohol, is mixed on the floor above. The small mixer shown at the operator's right is filled as required by means of a chute



New high-solids lacquer . . .

The new high-solids lacquers can give twice the covering power of old-style lacquers . . . enable operators to complete more pieces in a given time . . . because they provide far thicker coatings when dried. Each coat now does the work of two! The answer is more solids, less solvent. Yet, despite the new finishing speeds and economies afforded, their durability and appearance are not sacrificed. For production line finishes on metal, wood, fabric, glass, rubber, leather, paper, plastics—use high-solids lacquers and save!

LIKE GIVING EACH SPRAY OPERATOR TWO GUNS

ASK YOUR LACQUER SUPPLIER
for complete details and application data on these new time-and-money-saving lacquers, as they become available.
Hercules does not make high-solids lacquers, but concentrates on the production of the highest quality nitrocellulose from which they are made.
CL-53A

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Cellulose Products Department
HERCULES POWDER COMPANY
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Mass Production of Precision Castings

Fig. 18—After the mold has been filled with the investment, it is placed on a vibrator or "shaker table" to eliminate air and pack the material tightly. In about an hour, the investment has set and the fines risen to the top. Excess material above the top of the mold then is sawed off and the mold allowed to age for several hours. The steel plate is knocked off, exposing the mouth of the gate into which the metal will be poured later

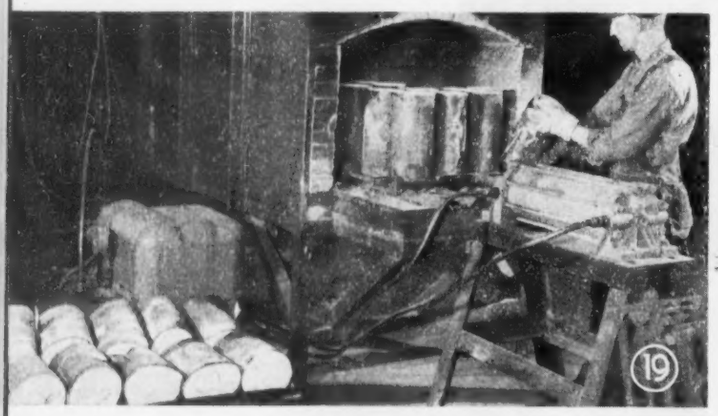


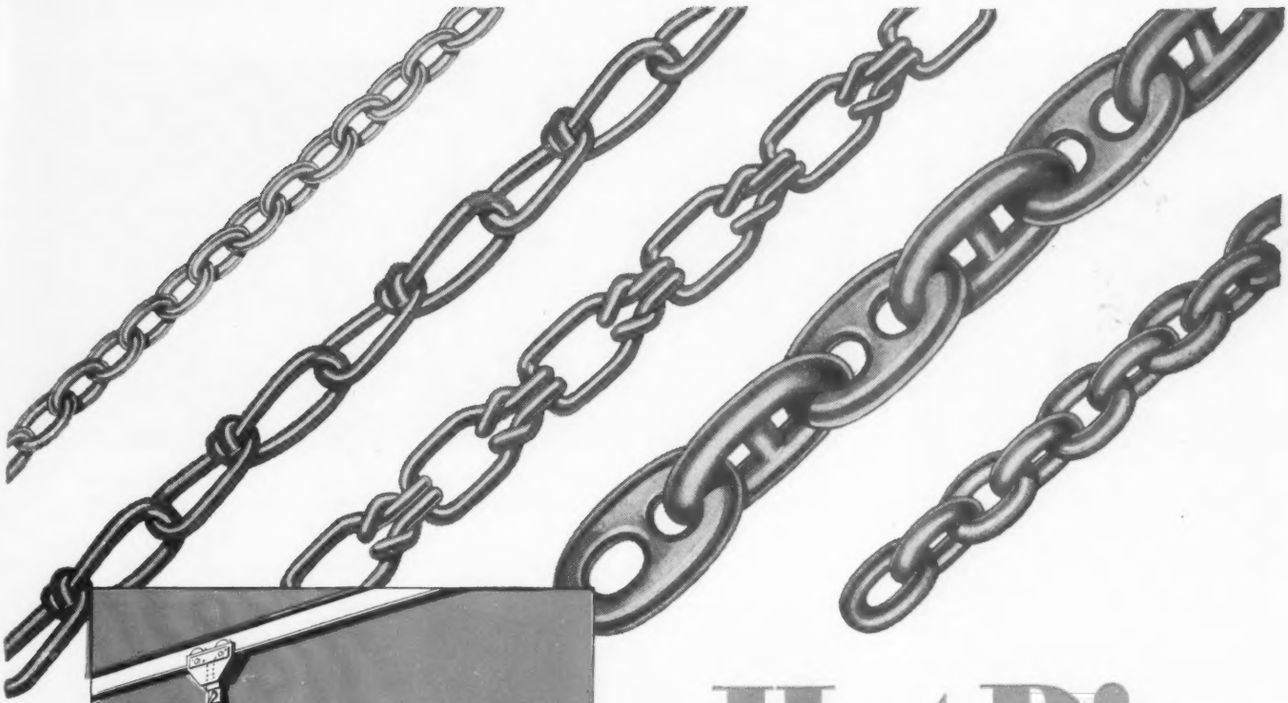
Fig. 19—The completed mold with the wax pattern in the center then is loaded upside down in a continuous furnace, as shown here, where the wax is melted out. Furnace temperature ranges from 1300 to 1900° F, depending on the heat being produced

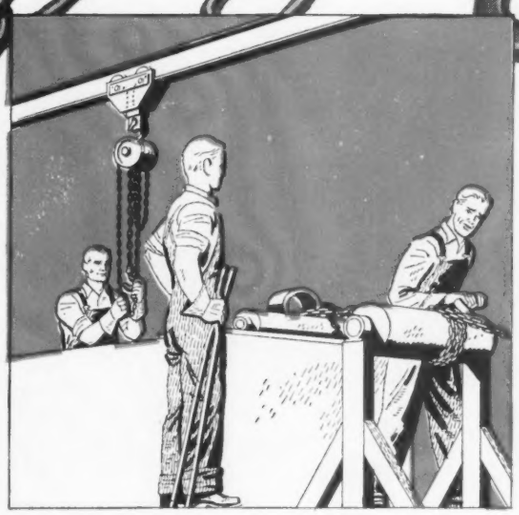
Fig. 20—Meanwhile, raw materials for the alloy to be cast (in this case, Type 347 stainless) are being accurately weighed out, melted down in Ajax induction furnaces and cast into small "stick" pigs

Fig. 21—Just enough metal in pig or "stick" form is melted down in this small indirect arc furnace to fill one mold. When the metal reaches the correct tempeature, as checked by an optical pyrometer to insure proper grain size and other desired metallurgical properties, the hot, baked mold is inverted directly over the pouring spout of the furnace. After the mold is clamped in place, the metal is poured by inverting the entire furnace and turning on about 3-lb air pressure from a line connected to the furnace. Air pressure makes possible casting of dense structures and the filling-in of thin edges

Fig. 22—After cooling for about 4 hours, entire casting assembly is knocked from the mold by means of a pneumatic hammer and excess investment material is removed

Fig. 23—Gates and risers next are removed by means of a high-speed rubber-bonded abrasive cutoff wheel





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CHAINS for every purpose—protected with the best possible coating of zinc by the Hanlon-Gregory method of Hot-Dip Galvanizing—will render greater uninterrupted service and eliminate maintenance costs.

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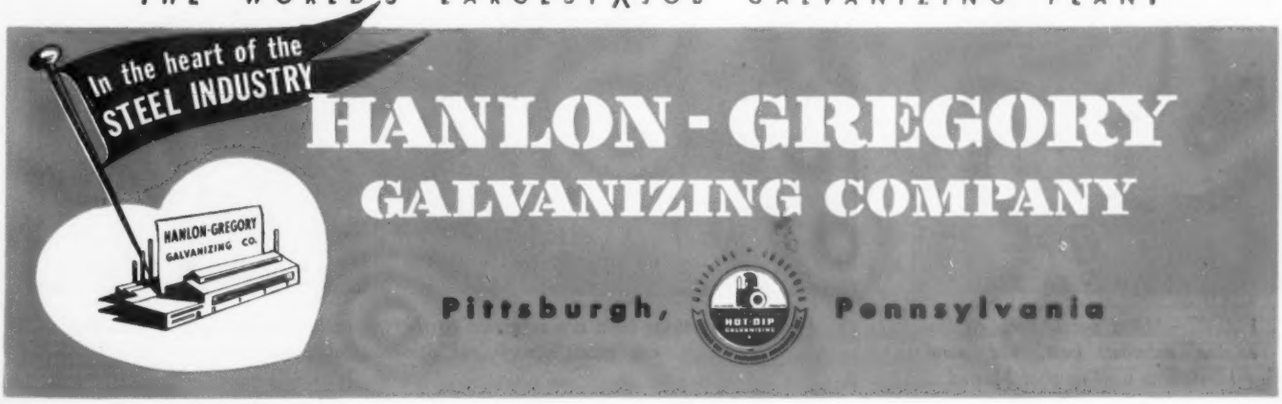


Fig. 24—Castings then are shot-blasted to remove scale and remaining investment material. This step would be eliminated in the case of castings with thin edges. Castings then are subjected to rough inspection to remove those with obvious defects

Fig. 27—Many parts, such as the engine exhaust port, are sand blasted as well as shot blasted

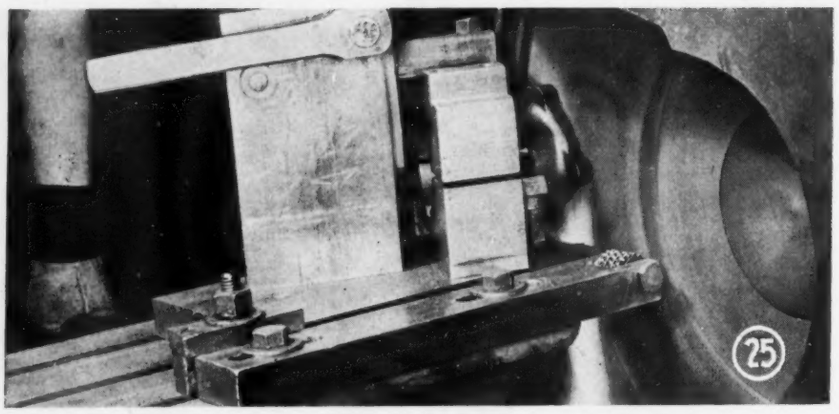
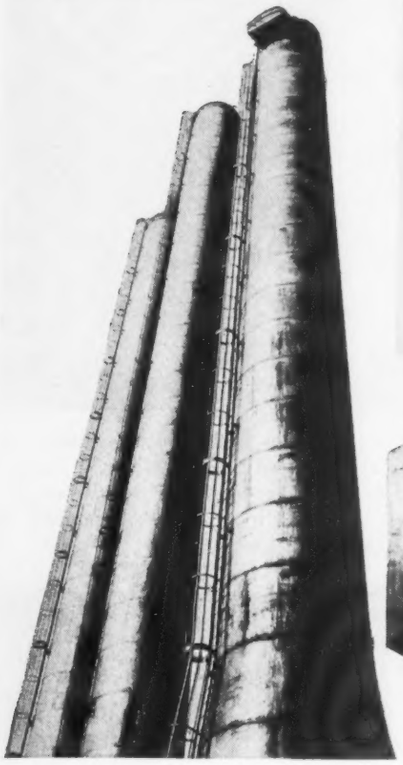


Fig. 25—Castings passing rough inspection are sent to the grinding department where gate areas are smoothed and surface irregularities removed

Fig. 26—Inside areas are touched up as needed with a small internal grinder

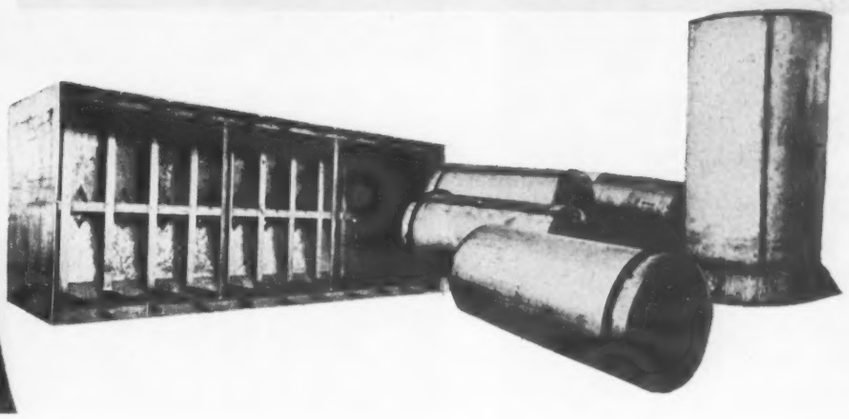
Fig. 28—Castings then are returned to the inspection department where they are given visual and dimensional inspection

PLANNING REPLACEMENTS



Annealing Covers	Steel Stacks
Bases—Welded	Weldments
Bins	Accumulator Tanks—High Pressure
Charging Boxes	Large Diameter Pipe & Mains
Elevated Tanks	Pots—Tin or Galvanizing
Pressure Vessels	Steel Plate Fabrication

Storage Tanks—oil-water-acid-propane-butane



There is no substitute for experience

Many outstanding steel mills are now using General American plate fabricated equipment which has rendered long and satisfactory service.

Much of this equipment was precision fabricated from drawings and specifications submitted by the customer. Some of this equipment was designed, fabricated and installed entirely by this organization.

Regardless of whether you want us to engineer and design the equipment, or you design the equipment yourself and have us fabricate it to your specifications, General American is equipped to do a good job.

You will be working with an organization which has the knowledge, experience and shop facilities to produce equipment for superior performance.

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Mass Production of Precision Castings

Fig. 29—Castings that pass visual and dimensional inspection are given a penetrative oil "Zyglo" test which, under black light, reveals cracks or other surface imperfections by a fluorescent effect

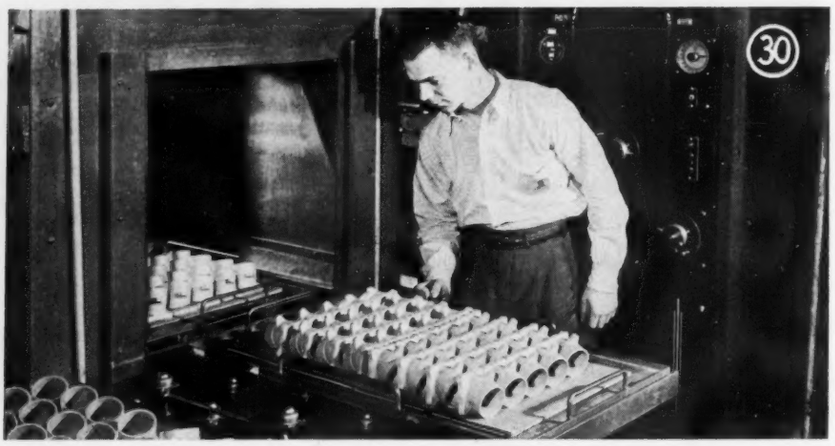

Fig. 30—As a final check on quality, trays of castings pass through automatic GE x-ray equipment. The x-ray head for this machine is fixed at a focal distance of 50 in. and completely enclosed in a lead-lined cabinet. A ball-bearing conveyor table makes it possible for one man to handle the complete operation

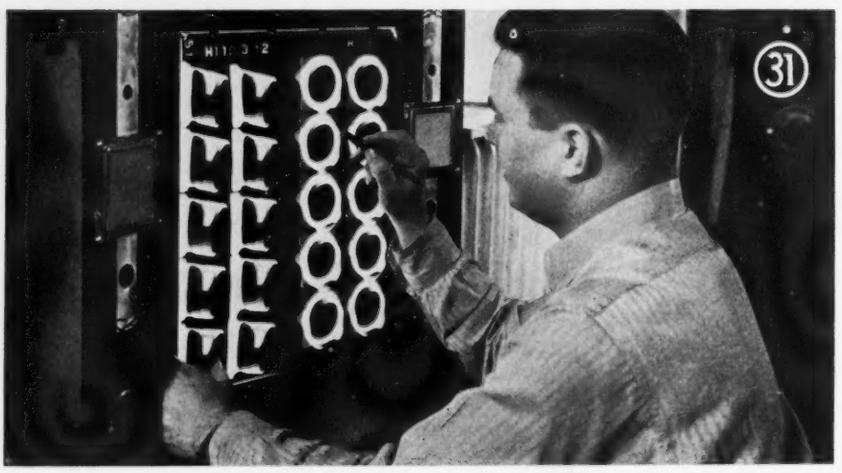

Fig. 31—Trained operators check every x-ray negative for internal flaws that would make the part unsuitable for use. Parts often are double checked by the customer, especially when physical property requirements are strict

No Blow-By Claimed for New Gapless Piston Ring

A new gapless piston ring, a departure from conventional types, is announced by Auto-Diesel Piston Ring Co., Cleveland. This ring consists of two identical parts that interlock when completely assembled forming a ring without a gap. A positive seal with no chance of blow-by is claimed resulting in the greatest possible compression.

The Helicam gapless piston ring is adaptable as an oil ring, if desired. It can also be made a contracting ring for sealing shafts, bearings, for replacing packings, etc. Regardless of application, it retains its expanding features.

This new type ring can be used as original equipment and replacement for diesel powered units of all types—stationary and mobile units and hydraulic and pneumatic operated industrial equipment. A descriptive folder may be obtained by writing to 3282 Superior avenue, Cleveland 14.

New Rectifier Operates Under Extreme Conditions

A selenium rectifier recently developed by Westinghouse Electric Corp., East Pittsburgh, Pa. can be submerged in boiling water or packed in ice and still turn alternating current into direct current at an efficiency equal to that obtained under normal conditions. The new rectifier consists of a heavily tin plated, hermetically sealed container inside which is placed the selenium suspended in oil.

Industrial electrical control devices; transformers, resittors, vacuum tubes, rectifiers and other heat-dissipating apparatus, are usually mounted inside a metal cabinet resulting in extremely high temperatures that mitigate against good efficiencies and long life for ordinary rectifiers. This new selenium rectifier will operate with only a slight drop in current output at a total temperature higher that the boiling point of water and will last much in excess of 1000 hours.

Extremes in temperature are not the only enemies of the rectifier. By actual test salt spray does not interfere with the performance of this new type.

★

A Cordial Invitation

TO THE FOUNDRYMEN OF AMERICA

AND TO PRODUCTION EXECUTIVES OF FOUNDRY DEPARTMENTS

You are most cordially invited to attend, May 6-10 in Cleveland's Public Auditorium, the sessions of the Golden Jubilee Foundry Congress of the American Foundrymen's Association and to see and examine, at the largest, most representative of Foundry Shows, equipment, products and services designed to assist you to achieve a greater output of better castings at lower production costs.

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★ **To reserve exhibit space at the Golden Jubilee Foundry Show... the *golden opportunity* foundry show... wire or phone A. F. A. today.**

Engineering NEWS

ANACONDA WIRE CITED AGAIN: H. Donn Keresey, president, reports Anaconda Wire & Cable Co., recently received the rarely bestowed Naval Ordnance Award for its work on a "top secret" device used in connection with magnetic under-water ordnance.

Details concerning the development are still a close-guarded secret, but it is said the device is one of the most delicately sensitive developments to come out of the war. It involves a gradiometer coil, so sensitive that introduction of a piece of steel no larger than a penny into the coil's field, is enough to detonate the explosive contained in the device.

The Navy citation was presented to the company by Radm. G. F. Hussey Jr. "for exceptional service to naval ordnance research and development."

During the war the company was cited with more than 20 Army-Navy E awards.

OVERNIGHT FACELIFTING: Distinctive interiors for executive, factory and general offices, banks, ships, residences and buildings of every kind may be provided with Metwal steel partitions developed by Martin Parry Corp., York, Pa. Panels are made to represent life-like wood grains or, if desired, treated with soft finishes. They present an all-flush surface from floor to ceiling when installed.

According to the Pennsylvania concern, partitions of this panel are quickly installed or moved, and are fire resistant. Construction features include: Studs spaced 24 in. apart, snap-on clip to facilitate erection, corrugated backing providing strength, and 3½ in. air space inside each panel to handle pipes and cables.

RESEARCH COVERS PRESSURE VESSELS: American Welding Society, American Society of Mechanical Engineers, American Institute of Electrical Engineers together with other engineering organizations recently started the ball rolling, through its representative organ, the Welding Research Council, on a comprehensive pressure vessel research program covering materials, design, fabrication, inspection and testing of unfired pressure vessels.

Walter Samans, now chairman of the ASME Boiler Code subcommittee on unfired pressure vessels, also is chairman of the new Pressure Vessel Research Committee. The program, it is reported, was initiated to answer need for quantitative data by those engaged in pressure-vessel design and construction to insure sound design and reasonable life. During the war, experimental work fell behind increased use of both carbon and alloy steels in larger and more complex designs of welded vessels.

In one of its first meetings recently, the new committee authorized employment of a full-time New York headquarters secretary to collect and maintain records, and to correlate projects approved with research facilities and personnel of selected university laboratories.

W. Spraragen, director, Welding Research Council, states he is receiving all communications in regard to the above position—if anyone is interested—at the council's New York office.

NAVY DISCHARGES PALLETIZER: *The Palletizer* is now a strictly civilian magazine. It was released from service by the Navy recently to continue its work in the materials handling field.

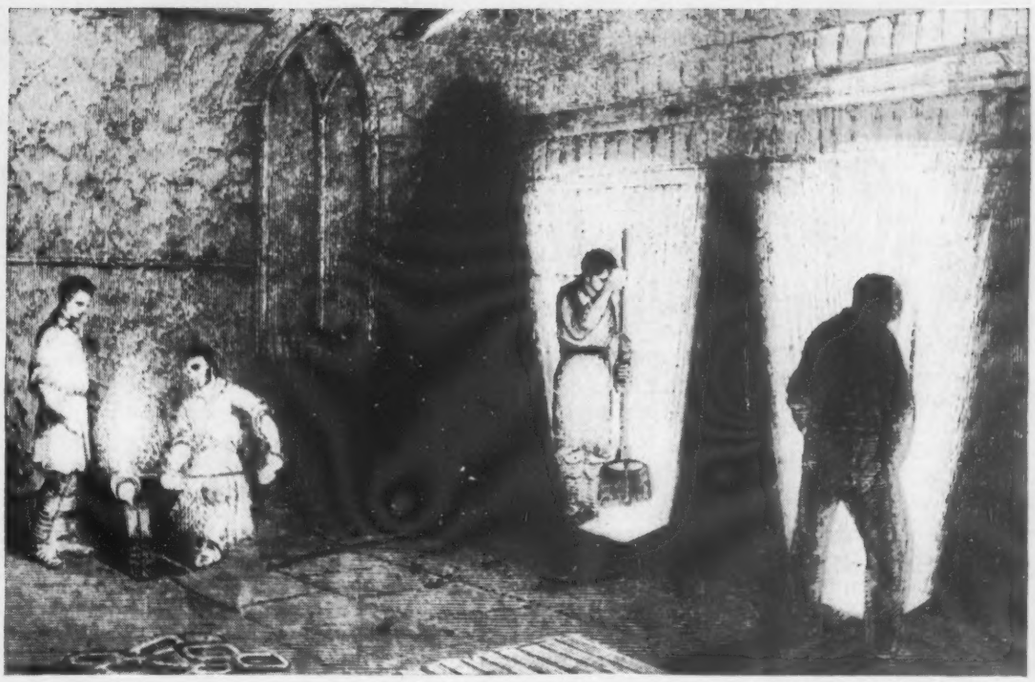
Still the same magazine, staffed by the same personnel, though now "in civvies," the magazine is operating under the Materials Handling Laboratories, an enterprise just established by the group of former naval officers who labored over Army and Navy materials handling headaches during the war.

According to N. L. Cahners, director of the newly-created lab, and former officer in charge of the Navy's laboratory at Hingham, Mass., the new undertaking will insure continuity of research, and will make available to industry the know-how in all phases of materials handling developed by the services during the war.

Cahners states the lab will offer facilities for original research, planning and testing, in addition to consultation services with qualified engineers.

BETATRON PRODUCES MESONS: Making use of x-rays from the one hundred million volt betatron, released recently from wartime secrecy, physi-

MIDGET ELECTRIC FURNACE: Built-in, automatic control maintains any desired temperature from 200 to 1750 degrees F in this all-steel furnace for small precision work. Manufactured by K. H. Huppert Co., 6830 Cottage Grove avenue, Chicago, its oven measures only 3 x 3 x 3 in. The 8½ x 10½ x 8½-in. unit is insulated, has high-temperature alloy elements, indicator light and indicating pyrometer. Current consumption is 500 w with 110 v ac



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WHEN STEEL WAS MADE LIKE THIS—

The Home of "Standard" Was Producing 1500 Tons a Year

Three quarters of a century ago, you might have seen activity like this at "Standard." An important producer of steel, the plant had 28 four-pot melting holes. Metal, broken into small pieces, was put into pots or crucibles, and melted at a very high temperature. In 1873, 1519 tons of crucible steel were produced . . . an impressive figure for that day. It was used in the making of tires.

Today, Standard's five open hearths have the capacity of 160,000 net tons, and could duplicate the entire output of 1873 in three days. Other departments at Standard have kept in step. Castings, for all classes of service, from 5 pounds to 130,000 pounds, and forgings up to 25 tons are regularly produced.

The experience gained in a century and a half is waiting to serve you. For your forging and casting needs, "Standardize on Standard."

BLW THE BALDWIN GROUP

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FORGINGS AND CASTINGS

The Baldwin Locomotive Works, Standard Steel Works Division, Burnham, Pa., U.S.A. Offices: Philadelphia, New York, Chicago, St. Louis, Washington, Boston, San Francisco, Cleveland, Detroit, Pittsburgh, Houston, Birmingham, Norfolk.

"STANDARDIZE ON STANDARD" FOR YOUR FORGINGS AND CASTINGS

cists in General Electric's Schenectady research lab succeeded for the first time in producing mesons artificially, one of the chief constituents of the cosmic rays continually bombarding the earth.

The betatron has open up for laboratory exploration a new energy between 40,000,000 and 100,000,000 v. Although this just reaches the lower limits of the cosmic rays, whose energies go up to billions of volts, many types of reactions in the atomic nuclei have been observed which could not be accomplished with lesser energies, according to the experts.

Announcement of the new results was made at a meeting in New York of the American Physical Society, in a series of four papers by Dr. George C. Baldwin, A. James Hartzler, and Dr. G. Stanley Klaiber, all of GE's research lab, and Dr. Marcel Schein, cosmic ray expert of the University of Chicago, one of the lab's consultants.

The meson, formerly known only through cosmic ray studies, is a particle considerably more massive than the electron, though lighter than the proton.

METER MEN GET TOGETHER: District managers of Bailey Meter Co., Cleveland, and Bailey Meter Co. Ltd. of Canada, met in Cleveland recently to study at first hand new developments in the organization's line of meters and controls. Much discussion centered around the company's line of electronic instruments. The engineers also studied possible uses of both old and new products in connection with present day needs.

LATE DEVELOPMENTS at a Glance: Information from Buffalo reveals The Houde Engineering Division, Houdaille-Hershey Corp., is producing a new device to dampen vibration of crankshafts in conventional auto and diesel engines. The development, brain-child of Bernard E. O'Connor, assistant chief engineer, is known as the viscous torsional vibration damper, and utilizes the newly-developed silicone fluid introduced by Dow-Corning Corp. of Midland, Mich. . . . . .

Heavy pipe smokers may be able to solve partially that weighty "mouth-dangling" problem by "taking a try" at the pipe offered by Cy Benz Pipes of Los Angeles, which features a stainless steel bowl. According to the maker, steel bowl, dural body and rubber mouth piece altogether weigh one ounce. . . . . .

Du Pont's Arlington, N. J., Plastics Department, reports development of a new foamed plastic, so light that a woman can balance 4 cu ft of the product on the finger tips of one hand, yet so strong that when used as a luggage core it will support a man's weight. Called cellular cellulose acetate, it combines insulation between heat and cold with structural strength, when bonded between metal. The plastic is being turned out in strips 3.5 in. wide and ⅝-in. thick in any length for the present . . . . . .

Industrial tires of a special synthetic rubber compound to resist the destructive action of oils, greases and salt brine as well as other severe service conditions are reported by B. F. Goodrich Co. Furnished on tires of all standard sizes, in both Vulc-On and pressed-on types, the compound is said to have little rolling resistance, according to the Akron concern . . . . . .

Selling rights to the Fish-Schurman optical contour comparator were recently acquired by the Sheffield Corp., Dayton, O., it was learned here recently. The instrument is used to compare or examine such parts as screw threads, dies and gears quickly and accurately. Accurate projection of the contour of part being inspected is stated to be instantaneous. . . . . .

Basic instrument used by the Signal Corps at Belmar, N. J., to make the original contact with the moon, was built by Sylvania Electric Products Inc., late in 1944, Dr. R. M. Bowie, manager of the company's research activities, revealed recently at Flushing, N. Y. Equipment, modified for lunar experiments by Lt. Col. DeWitt, Signal Corps engineer, and engineers at Evans Signal Laboratory, were housed in three portable cabinets, each about the size of a large upright piano, the doctor stated. . . . . .

Before a conference of American Society of Mechanical Engineers in Los Angeles, R. C. Boulton, member of the engineering staff, Douglas Aircraft Co. Inc., Santa Monica, Calif., made a plea for co-operation in his address on standardization in the aircraft industry. His address is appearing in the current issue of *Industrial Standardization*. According to the American Standard Association, the address offers a challenge to every individual interested in standardization. . . . . .

The Weatherhead Co., Cleveland, announces all ermeto inverted SAE and compression tube fittings using a pipe thread on some portion of the fittings will henceforth be supplied with Dryseal threads. According to George H. Hufferd, vice president in charge of engineering, the move was made to conform to the adoption of Dryseal threads by the automotive industry as standard on tube fittings. The company is now distributing an 8-page booklet explaining the new setup. . . . . .

In this postwar period, electronic engineers have available for exploration huge new regions in the radio spectrum. They are now working as high as 30,000 megacycles, and future research will undoubtedly extend into even higher microwave frequencies, David B. Smith, vice president in charge of engineering, Philco Corp., stated in an address recently before the Engineers Club of Trenton, N. J. Wartime radar research is already making possible notable advances in development of smaller and more efficient radio parts, radio relay systems, broadcasting and reception, mobile communications such as dial phones for automobiles and television, he said. . . . . .

From Unionville, Conn., comes word of a new unified ignition system for aircraft, automotive, marine and industrial engines. Called Uni-power, the development is the product of Lapointe-Plascomold Corp., and consists of a single-unit battery ignition system in which coil, condenser and distributor have been combined. It features a centrifugal spark advance with positive, accurate spark control, providing maximum ignition performance under all conditions, it is reported . . . . . .

Some 80,000 small cover castings were produced recently from a set of dies made from Maxinium die casting steel, according to a report received from England. In producing a still larger box casting, Edgar Allen & Co. Ltd. reports 55,000 pieces were made using the same type of die in the plant of Frys Die Castings Ltd., London . . . . . .

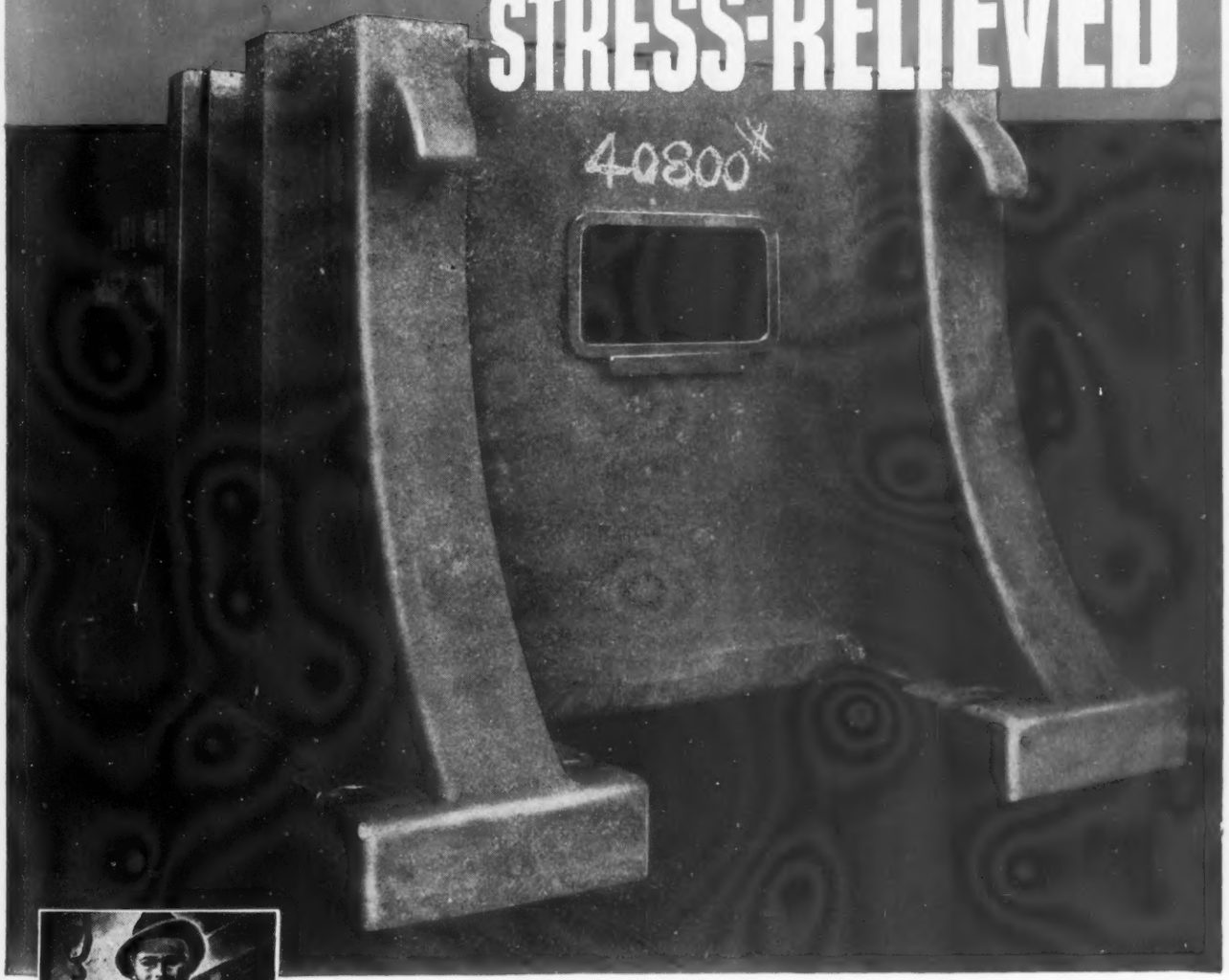
Fighters have no monopoly on this weighing-in business to indicate tip-top "shape." According to *Baldwin*, Baldwin Locomotive Works' quarterly publication, when a locomotive job goes into the company's scale house to be weighed, not only a total weight is taken but the weight on each individual wheel. Without proper distribution of the total weight the locomotive would be out of balance and, if seriously out of balance, would be dangerous to operate, if not disastrous at today's high speeds. On the big steel platform from which total weight is obtained are 24 individual, movable scales all sensitive down to units of 10 lb each. . . . . .

20 TONS OF STEEL CASTING

and every pound

STRESS-RELIEVED

Twenty tons, 40,800 pounds to be exact—that's the actual weight of the husky rolling mill pinion housing illustrated. It's a lot of steel in one piece, but after heat treating operations by PSF experts, every pound of this massive hulk is free from strain or stress, and ready to give dependable service. Cast with skill born of long experience, tested by advanced laboratory methods, it is correct in dimensions and analysis, and completely uniform in grain structure and strength. Call PSF in on your next steel casting job and let progressive foundry techniques get you results.



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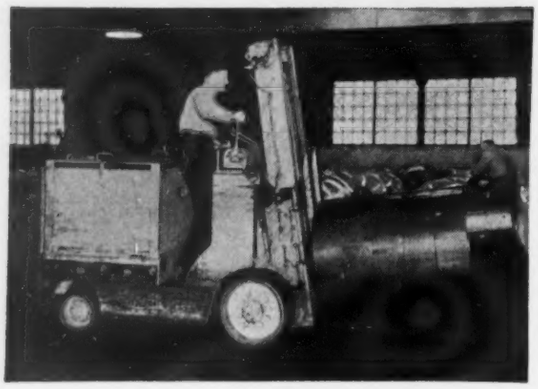
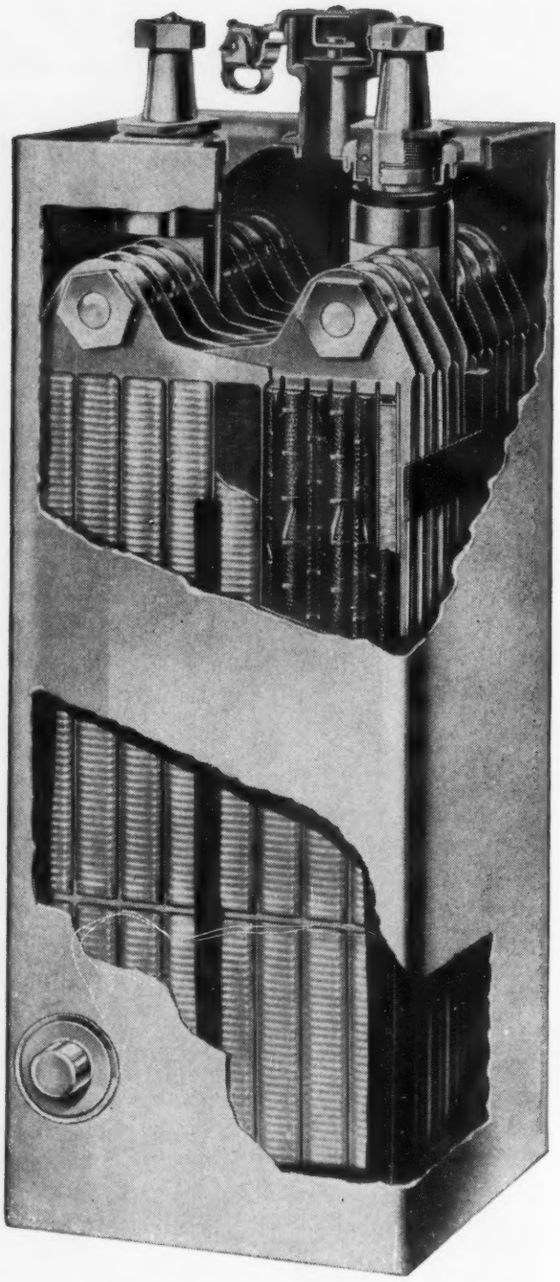


BATTERY TRUCKS... give most trouble-free service...



...ALKALINE BATTERIES have the most durable construction

ALL KINDS of material handling operations are being performed by battery industrial trucks with a remarkable record of day-in-and-day-out dependability, freedom from trouble and overall efficiency. In factories, warehouses, railroad shops and docks . . . wherever materials must be moved . . . they are staying on the job with an amazing regularity that surpasses even the highest expectations of users.

An important reason for their high availability for service is their comparatively simple operating mechanism. The electric drives in a battery truck have the minimum of moving parts to require attention and replacements, and are free from wear-and-tear vibration. Thus a battery truck is rarely out of service for repairs. Exchange batteries keep the truck continuously supplied with power. So except for the few minutes to change batteries two or three times per 24-hour period, the truck need not stop working for servicing its power unit. It is also economical to operate. Not only does it use power most efficiently but the current used for battery charging is the lowest-cost power available. The truck starts instantly, accelerates rapidly yet consumes no power during stops.

Altogether, the battery truck is a most dependable and economical material handling unit . . . especially when powered by Edison Alkaline Batteries. With steel-cell construction, and a fool-proof electrochemical principle of operation, they are the longest-lived, most durable and most trouble-free of all industrial truck batteries. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. In Canada: International Equipment Co., Ltd., Montreal and Toronto.

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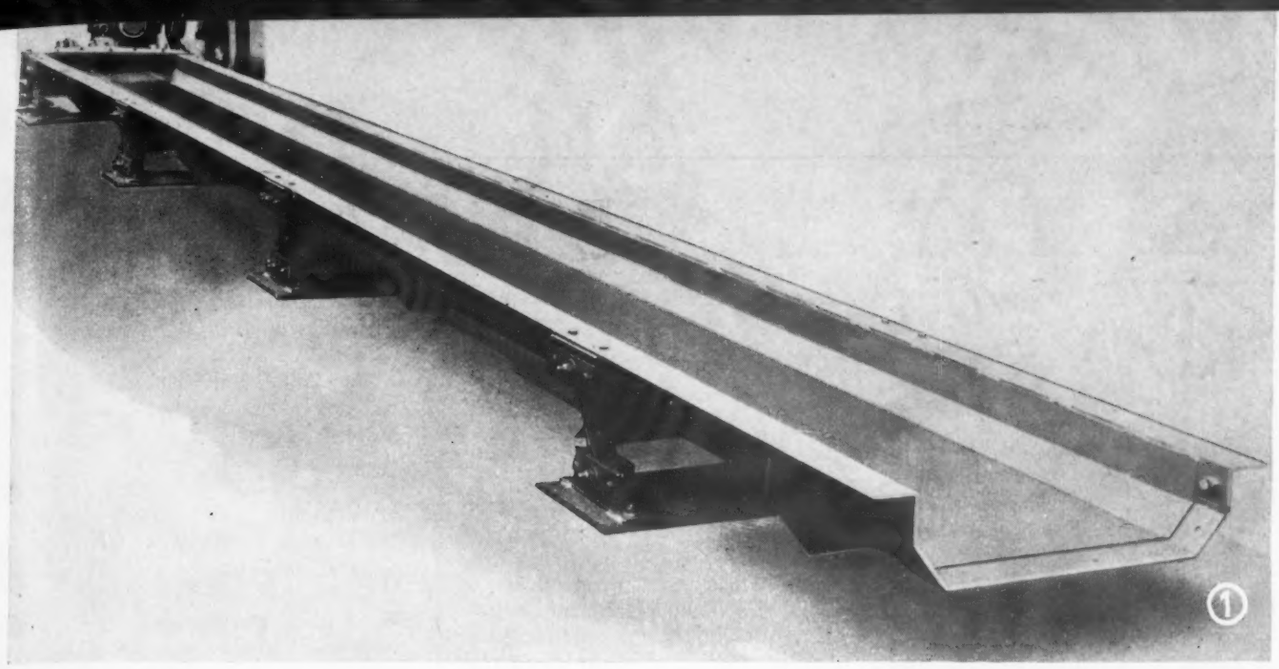
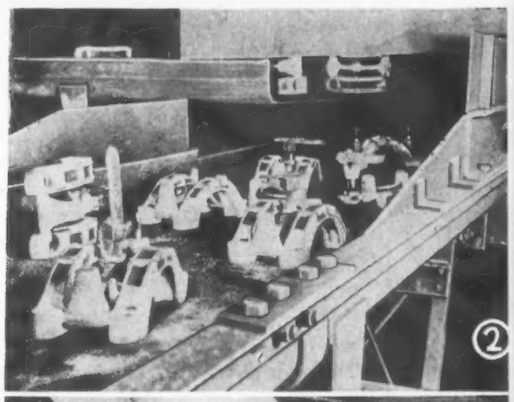


OSCILLATING-TROUGH Conveyor



Conveyor emerges from war experience with reputation for handling sharp, jagged, abrasive, wet, oily or hot metal parts and castings. Oscillation, by eccentric drive, results in maximum forward travel of 50 feet per minute

ALTHOUGH numerous installations had been made prior to war's end in foundries, steel plants and machine shops, word about a new type conveyor for difficult handling jobs was not given general circulation until the close of the war.

The conveyor, an oscillating trough design produced by Link-Belt Co., Chicago, has been used with marked success by shell turning plants and machine shops for handling steel chips and turnings, together with the coolant, as they came direct from the machines. Steel plants are employing variations of the conveyors illustrated for handling hot mill scale and conveying scrap steel away from the shears. Gray iron and malleable iron foundries use oscillating trough conveyors for handling both hot shakeout sand and hot castings. They were designed especially to meet such severe conditions of service.

This conveyor consists of a flexibly supported trough of plate steel having a rectangular cross-section. It is oscillated back and forth by an eccentric drive run by an electric motor which is mounted at the receiving end of the conveyor.

The range of capacities of this type of conveyor is large, being varied merely by making the depth and width of the trough to the size required by the material to be handled and by installing a power drive that is of the proper horsepower.

Forward travel, which must be either horizontal or on a downward slope, varies from 20 to 50 fpm for most materials, depending upon the type of material being handled and the type of unit installed, whether it be the short hanger or the long hanger type.

The variety of materials that can be handled varies as greatly as the capacity that can be carried. Sharp, jagged, abrasive, wet, oily and hot materials are handled with dispatch and at low cost.

Mechanically, this trough conveyor is simple, having few working parts. There are no parts moving with respect to each other except the drive, hence the only lubrication required is at this point. Another stated advantage is that there is no return run which might carry back materials. Wear on the trough is assert-

SIZING *Shock Absorber Housings*

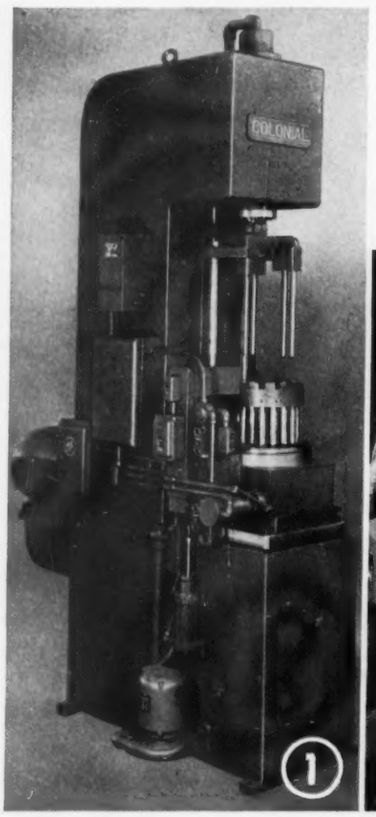
RATE of 720 tubes per hr has been achieved by a new machine for automatic finish sizing and surface conditioning of the ID of steel shock absorber housings. Hardened steel balls are pushed through tubes, finishing them to 1 in. ID, in a utility-type hydraulic press equipped with automatic indexing fixture, both made by Colonial Broach Co., Detroit. An automatic loading and feed mechanism for the balls also is built into the machine.

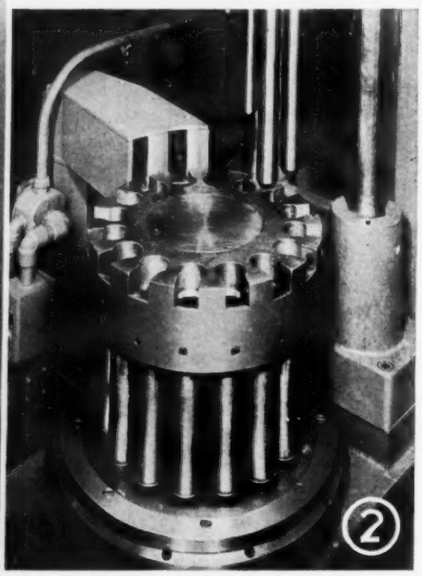
Installation operates on a continuous cycle, and unloading of work is automatic. Operator merely drops tubes—two at a time—into indexing fixture (Fig. 2) at loading station. As shown in Fig. 1, press ram is fitted with a head having four push rods. The two toward the column of the machine are for pushing balls through tubes (two tubes at a time). Two rods at front of machine column are for ejecting finished tubes from fixture. Automatic ball feed mechanism is at the left.

Fig. 2 is a close-up of fixture with ball chutes in the background. As fixture indexes two tubes in front of these chutes, triggers release two balls which roll into position on top of open end tubes. At next machine station, balls are pushed through. Balls then drop into a lower hopper and are raised into the upper hopper by hydraulically operated feed mechanism which is interlocked with the machine cycle. More than two balls are used in the machine, design of the feed mechanism being such that raising of two balls positions two other balls in the chutes ready for release by the trigger mechanism.

When finished tubes reach the station at extreme right of machine, the two rods in the foreground, Fig. 2, push tubes down and out of fixture. Tubes drop out through an opening in side of machine base.

Machine is hydraulically operated, including index and feed mechanisms. Design of the hydraulic mechanism follows the standard Colonial design practice as used on company's broaching machines. Indexing takes place near top of automatic return stroke, just before ram starts down again. Machine has a rating of 6 tons, with an 18 in. adjustable stroke.





ed to be slight and there are no joints to be attacked by abrasion.

At a very modern malleable iron foundry the rubber bushings were found to be in good condition and suitable for intermediate additional service after 16 months of use. The trough showed little wear.

There are 100 articulation points, four on each of 25 supports, requiring no maintenance attention, an important consideration in foundries and other locations where there is a dust problem. Handling can be in a straight line only, but with the installation of two or more units at angles to each other, general flow direction can be changed. Because there is no return belt, the drop from one belt to another in multiple installations is much less than with a belt or apron conveyor. The rapid oscillation of the trough serves to level-off the material like water, thereby eliminating spillage of materials.

By the addition of partitions lengthwise along the trough the conveyor can be made to handle more than one material without mixing. As the conveyor can be made to discharge at right angles, materials can be distributed along the route of material flow.

Two Types of Conveyors

There are two types of oscillating-trough conveyors, each designed for a particular type of installation. The long-hanger construction is employed where trough tunnels below the conveyor are permissible or where it is possible to floor-mount the conveyor.

Short hanger construction permits installation of the conveyor in a shallow trench along the floor of a machine shop for the handling of metal turnings, borings, etc., or in a rolling mill to carry away hot mill scale.

It has been found that power requirements for this type of conveyor are lower than for apron conveyors. In one foundry, it was found that after snap-flasks were discharged onto oscillating conveyors, they could handle 75 tons of sand and castings per hour, moving at 40 fpm.

The oscillating-trough conveyor provides a suitable condition for magnetic separation, because of the uniform spread of sand on the conveyor. With this type of installation, it is claimed that about 98 per cent of the iron is removed by a magnetic pick-up belt, and only pieces still embedded in a core-lump occasionally get by.

—o—

A new data sheet for cutting fluids for use with drilling, machine reaming and tapping is offered by Westinghouse Electric Corp., Pittsburgh. Types of materials from metal to asbestos and hard rubber are listed with types of fluids to be used.

Century Form J motors driving a battery of automatic screw machines where tolerances are often held to .00025".

CENTURY MOTORS'

Unusual Freedom From Vibration Helps You Produce Precision Parts With

CLOSER TOLERANCES

SMOOTHER SURFACES

FEWER REJECTS

Century motors are widely known for their ability to run smoothly and quietly — and with an unusual freedom from vibration. On machine tools this means that production parts, tools, dies, or fixtures are more accurate because vibration is not transmitted to the driven machine.

Precision built to match the precision of the machines they drive — Century motors stand up under the toughest kind of operating conditions. Rugged frames, accurately machined feet, accurately aligned bearings, and many other features contribute to their outstanding performance.

Engineered to the functional characteristics of the machines they drive to assure top performance — Century motors are a vital factor in producing a better product at a lower cost.

Century motors are available in AC or DC types and sizes from 1/20 to 600 horsepower. Specify Century motors on all your electrically powered equipment.

Century C MOTORS

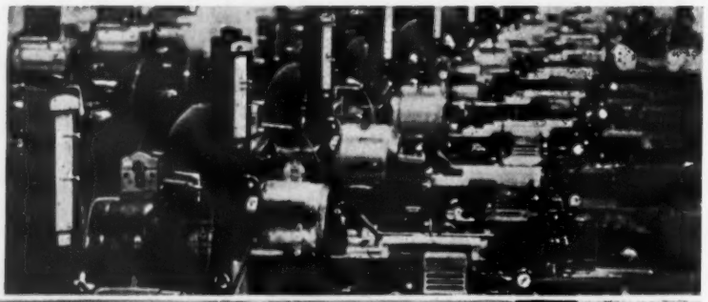
460

CENTURY ELECTRIC COMPANY • 1806 Pine St., St. Louis 3, Missouri

Offices and Stock Points in Principal Cities

New High-Amplification Gage and Modern Internal Grinder Hold . . .

Tolerances TO MILLIONTHS OF AN INCH



BY USE of a new high-amplification gage, tolerances held accurate to millionths of an inch in grinding, lapping, super-finishing, inspection and assembly have been applied to mass production. Wartime experience gave assurance that such extreme precision is practical for whatever requirements field performance in the near future dictates.

Where it was decided to use direct fuel injection of high octane gasoline in the engines of certain aircraft, unusual production and inspection problems developed at the Eclipse-Bendix plant, Elmira, N. Y. In manufacturing these fuel injection devices in large quantities with previously unheard-of production part tolerances, clearances in this assembly had to be controlled so that permissible variation of either the hole or the cylindrical plunger was ten millionths of an inch, plus or minus 0.000005-in.

Development of the high amplification Precisionaire gage by Sheffield Corp., Dayton, Ohio provided the solution. This flow type air gage could readily be applied to accurate measurement either of internal or external dimensions to the tolerances required, with gaging speed and ease of reading that would permit quick checks of taper, bell-mouth, roundness and size.

In this extensive application more than 200 gages were used, with a required duplicate performance within three millionths of an inch. It was necessary to calibrate master ring gages mounted in non-conductive brackets to prevent thermal expansion and incorrect readings due to inspector's handling of rings. These masters were then used to check all the air gages used throughout grinding, lapping and inspecting phases of production. Machine operator would use the gage to check condition of the hole and determine what corrective adjustments might be required for finishing the hole to straightness within limits. During manufacture, the parts were inspected at four successive stages. A single measurement was positively determinable in less than 2 sec after part had been positioned at the location where measurement was desired. With a gage mounted on each machine head, as shown (left), they are most readily seen for quick, accurate reading by operators of these Bryant internal grinders.

In order to minimize part losses in grinding and finishing, 16 size classification, each 0.000005-in. apart, were established permitting a total range of part diameters eighty millionths wide. It was still necessary at any size step that the part be round and straight within the ten millionths limit. However, it became possible for the grinding machine operators to correct parts out-of-tolerance by discovering the error while the part was still in the machine and grinding to a size class several steps larger.

Parts Salvaged By Lapping

Those parts which were found to be out-of-round in excess of ten millionths, or which were tapered, were in most cases salvaged by corrective lapping. Each lapper was supplied with the same measuring equipment.

Extreme simplicity of the amplification gage has made it possible to use unskilled personnel and to complete the training required for operation of the measuring equipment in a matter of hours for any of the precise dimensions in these critical elements of the product. Lower photo at left shows women of the Eclipe-Bendix identification department inspecting bores for hole measurment and classification. Checks may be made with inspector seated, as shown in lower photo, thus reducing fatigue and making possible the use of partially disabled persons. Women also are said to prefer this manner of inspection. Flexibility of application of unit permits wide variety of production-line installations.

Gas-Fired Oven Increases Production

Designed for the high speed baking of varnishes on wound armatures and stators, the Despatch Oven Co. of Minneapolis, Minn. has built a gas-fired oven with a maximum temperature of 550°F. Inside dimensions are: Width, 7 ft; length 7 ft 6 in.; height 7 ft 6 in.

In an installation at the National Electric Coil Co., Columbus, O., a battery of these "S" type ovens reportedly increased production, improved quality, and reduced baking time and operating cost.

Each compartment of these ovens is equipped with full automatic temperature control and a full safety system to meet Factory Mutual Fire Insurance Underwriters specifications.

Advertisement

CLEANING AND CORROSION TIPS

Issue No. 1

May Published Monthly in the Interest of Advancing Metal Cleaning Progress 1946

TODAY, MORE THAN EVER, industry's profits depend upon improved plant performance and reduced plant production costs. Costs, perhaps secondary to increased production during the war, must now be examined in minute detail. Each process—even those which apparently function efficiently—must be checked for further improvement. It is our aim to aid the metal cleaning departments in American industry in producing better cleaned products at a faster rate and at *lower cost.*

W. P. Drake
Manager of Sales
Pennsylvania Salt Mfg. Company

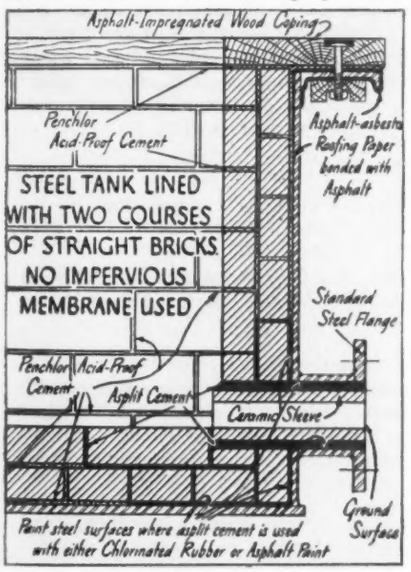
CASE NO. 401

Brass Company Saves $170 A Month in One Operation

Removing Buffing Compound Without Discoloration Was the Big Problem

A well-known brass company was busy turning out spigots and other plumbing fixtures. Rejects were numerous since cleaners strong enough to remove the buffing compound from the brass prior to chrome plating had a tendency to discolor the metal.

After studying the problem, a Pennsalt man with his technical experience suggested one of the Pennsalt Cleaners, which not only met the exacting requirements of the job, but actually saved on an average of $170 a month on the cleaning operation.


Asphalt-Impregnated Wood Coping
Penchlor Acid-Proof Cement
Asphalt-asbestos Roofing Paper bonded with Asphalt
STEEL TANK LINED WITH TWO COURSES OF STRAIGHT BRICKS NO IMPERVIOUS MEMBRANE USED
Standard Steel Flange
Penchlor Acid-Proof Cement
Asplit Cement
Ceramic Sleeve
Ground Surface
Paint steel surfaces where asplit cement is used with either Chlorinated Rubber or Asphalt Paint

Cross-section view of a pickling tank in a large steel mill. Penn Salt's Penchlor Acid-Proof Cement and Asplit Cement used in its construction.

CASE NO. 425

Cleaning 3 Metals at Once Cuts Cost 20% for Silverware Maker

In cleaning stainless steel, britannia metal and brass pieces, this manufacturer had found it necessary to use a different cleaner for each metal. The Pennsalt man suggested a cleaner which now cleans all three metals in the same solution at one time in both electrolytic and still tank operations—and slices cleaning costs 20%.

CASE NO. 451

Pre-Cleaning Eliminated on Adding Machine Parts

Guided by the precision demands of such parts as springs, bearings, and key arms, an adding machine corporation had been using a laborious pre-cleaning operation prior to electrolytic cleaning. A recent survey of the setup by the Pennsalt man resulted in the adoption of a certain Pennsalt Cleaner. The pre-cleaning operation was eliminated entirely and over-all cleaning costs were reduced about 60%.

CASE NO. 455

One Cleaning Process Replaces Three

Furniture Maker Finds Slow, Costly Hand Operations Unnecessary

Prior to electrolytic cleaning, tube frames in this factory were first given a sawdust cleaning followed by an actual hand-scrubbing operation.

A Pennsalt Cleaner, adopted on the recommendation of a Pennsalt man, with his knowledge of advanced metal cleaning, now cleans the tubing thoroughly in one operation and prepares the surface properly for the exacting chrome plating operations. Costly hand operations are out, production costs are down.

CASE NO. 475

Electrical Products Metal Cleaning Costs Down 28%

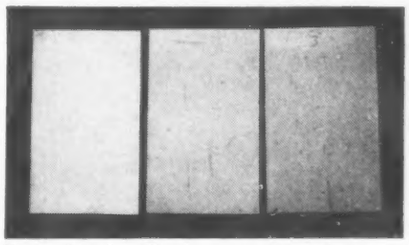
Use Same Cleaner Before Plating or Enameling

A maker of electrical products had experimented with many different makes of cleaners, trying to get junction boxes of low carbon steel really clean. Finally, he was forced to use one cleaner for those boxes to be enameled and another for those to be plated.

When the Pennsalt man was called in, he studied the problem and then, with his practical knowledge of cleaning methods, suggested a single Pennsalt Cleaner which is now cleaning both types of junction boxes thoroughly (for the first time) and actually cutting cleaning costs 28%.

THE LAB NOTEBOOK

Ultra Violet Light Aids in Testing Metal Cleaners



In testing the effectiveness of metal cleaners it is always necessary to know when the surface is clean. The use of ultra violet light immediately reveals unremoved soil (oils and greases) as shown by the above picture taken under ultra violet light. These tests were made at the Whitemarsh Research Laboratories.

YOU NEVER CAN TELL

Take the case of the production manager for one of the nation's largest automobile manufacturers. He was glad to see the Pennsalt man the morning he called. Not because the production manager had a problem. On the contrary, he was anxious to show the Pennsalt man, who had never visited this plant before, the efficiency of his cleaning setup.

As the two of them watched the cleaning operations, one question led to another; the Pennsalt man told the production manager the latest developments in advanced metal cleaning, and the plant's cleaning operations developed an entirely new aspect. Thinking along these lines, new cleaning ideas crystallized, until shortly, the production manager knew how the seemingly efficient cleaning operation could be materially improved.

As a result of this exchange of ideas, this automobile company's metal cleaning is now being done by a new method and with a Pennsalt Cleaner. Now as much cleaning is done in 320 man-hours as formerly required 3,000 man-hours.

THE POINT IS: No matter how efficient your cleaning operations are, the Pennsalt man may be able to help you turn out *better work . . . faster . . .* at a *lower production* cost.

If you would like to see the Pennsalt man, write to Dept. S. If your problem is urgent—wire, and he will call immediately.

ADVANCED METAL CLEANING
PENN SALT
PENNSYLVANIA SALT MANUFACTURING COMPANY
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Special Chemicals Division
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NEW YORK · CHICAGO · ST. LOUIS · PITTSBURGH
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Pattern Lumber Shortage Threatens Foundry and Related Industries

March 23, 1946

Mr. I. H. Such,
Engineering Editor,
STEEL,
Penton Building,
Cleveland, Ohio.

Dear Mr. Such:

We are writing you regarding a problem which we believe to be of concern to your magazine and its readers. The problem has to do with the current lumber situation as it affects the pattern and foundry industries.

As the newspapers have been indicating, the lumber situation in the United States is in a very precarious position. The demand far exceeds the supply and there is no apparent relief in sight. It must be obvious to you that the information concerning lumber appearing currently in the newspapers and receiving the bulk of the attention of the governmental agencies, is lumber for construction purposes.

We realize that construction is very important, but it is our contention that this shortage of lumber extends beyond mere construction and deep into the heart of our basic industries and as a result, will quickly and inevitably bog down our entire reconversion program and affect every person in the United States, if not the world, unless remedied.

Two such industries, and I believe you are in accord, are the pattern and foundry industries. No one familiar with these industries will deny that they are basic. The pattern industry is the first step in production. Without patterns no castings can be made, and without castings industry cannot proceed. It follows that if industry cannot proceed the entire country will eventually bog down. It is more or less like the story of the lack of the horse shoe nail that eventually caused the downfall of a country, the horse shoe nail in this case being the lumber required for the pattern industry.

Before proceeding we would like to make our position clear. As you are probably aware, we are engaged in the manufacturing and sale of pattern shop supplies and equipment and pattern lumber. Despite this our motives in appealing to you are not selfish. For years, and we believe the records will bear us out, we have considered ourselves as spokesman for the pattern industry. We would like to have ourselves considered thusly in this instance also. The pattern industry and the pattern shops in this country are relatively small. They have no collective or individual representation in Washington. They are an unknown and forgotten part of industry as far as Washington is concerned, as we have discovered in our various trips there. Because we have, in the past, attempted to help solve some of the problems facing the pattern industry, they are again looking to us for help.

Repeating ourselves, we believe the matter which we are calling to your attention is even deeper and more important than our own industry and will eventually affect the entire country if not remedied. We again assure you that we are willing to cooperate with you, or with anyone who is interested in this matter, to bring it to a speedy denouement.

In the past few weeks the scarcity of pattern lumber has been brought to our attention more forcibly. We are constantly receiving inquiries from pattern shops and foundries for lumber extending from Maine to Minnesota and from Florida to Colorado. Many of these inquiries are in the nature of telephone calls and the party on the other end of the wire puts up an impassioned plea regarding the urgency of his needs. A goodly portion of the calls and written inquiries are from people who have never done business with our company, indicating that this growing need for lumber is not of our own conjuring. Our salesmen who travel the entire country are constantly beseeched by the people on whom they call, customers and otherwise, to furnish them pattern lumber. It is the first thing mentioned on any call and it is impossible to help these people in view of the existing situation. These facts can be verified from our files or by calling various pattern shops in the city, state or country.

Following through it can be seen that this situation will shortly make itself felt in the foundry and fan out from there, eventually affecting practically every industry in the country. We are, therefore, asking your assistance as spokesman for the pattern industry to help solve this problem.

For your information, we have estimated that the approximate needs of the industry for a period of a year to be in the neighborhood of 33,000,000 board feet of pine, suitable for pattern purposes. Thirty-three million board feet is approximately one-tenth of one per cent of our total production of lumber, practically an insignificant amount, but of vital importance to our national welfare.

The pine can be of the following species:

Pinus Lambertiana — (California Sugar Pine)
Pinus Strobus — (Northern Pine)
Pinus Monticola — (Idaho White Pine)

—in grades ranging from No. 2 Common and No. 2 Shop to 1 & 2 Clear, and from thicknesses varying from 4/4 to 16/4.

We are unable to determine the precise cause for the existing shortage, that is, whether the lumber is being diverted to other purposes, whether there is a scarcity of lumber, labor or equipment, or whether the matter hinges entirely on the OPA. It is possible it may be a combination of all three.

One of our representatives recently spent a month in the West trying to buy pattern lumber. He contacted practically every known mill in the California, Washington and Oregon areas that could furnish such lumber and in this period he obtained only four carloads, or approximately 100,000 feet, in view of the tremendous backlog of orders. This is indicative of the general situation.

This problem is of such magnitude that it will affect every industry in the country, large and small, and eventually every individual unless the situation is alleviated.

Very respectfully yours,
THE KINDT-COLLINS COMPANY
(signed) E. T. Kindt
PRESIDENT

Color Dynamics
. . . the scientific use of the energy in color to build up the morale of workers—to reduce fatigue, absenteeism and accidents—to improve quality and quantity of production.

Color Dynamics installation in the plant of Joseph T. Wood Company, makers of sports shoes, Ware, Mass.

COLOR DYNAMICS helps to build better shoes for sport!

HOW CAN A WORKER'S vision be improved so that tension and eye fatigue are lessened? How can danger of accidents from overhead conveyors and mobile equipment be lessened? How can the "bearing down" feeling often caused by the overhead clutter of beams, pipes, and cross bracings be corrected?

Industry is finding the answers to these and many similar questions in Pittsburgh's new science of COLOR DYNAMICS.

Production executives such as those in the Joseph T. Wood Company of Ware, Massachusetts, makers of sports shoes of many kinds, are discovering by experience that color, properly "engineered" on a machine, on walls, ceilings and on floors has a marked influence on employees' health, morale and skill. For the principles of this new painting system are based upon the natural reaction of human beings to the energy which scientific research has shown that color possesses.

By using color on operating parts of a machine which contrast with the materials being fabricated, the work is easier to see. Receding colors on the stationary parts of the machine and on walls provide eye-rest periods. Color symbols readily identify danger areas.

Labor and management benefit alike by such purposeful use of color. Continuity of employment is promoted. Efficiency of operation is improved. Quality of production—as well as volume—is maintained.

You can readily test the value of Pittsburgh's COLOR DYNAMICS on a machine or two in your plants. See what a difference it makes in the attitude of your workers towards their jobs and the kind and volume of work they turn out!

Write for a FREE copy of our book, *"COLOR DYNAMICS for Industry,"* which explains this new painting system. Address Pittsburgh Plate Glass Company, Paint Div., Dept. ST-4, Pittsburgh 22, Pa.

Paint RIGHT with Color Dynamics
Paint BEST with Pittsburgh Paints!

The benefits of COLOR DYNAMICS are made more enduring when you use Pittsburgh long-lasting quality paints. There's a Pittsburgh Paint for every need.

WALLHIDE—for one-day wall painting—available in three types. **PBX**—gives extra durable finish which can be washed frequently without streaking or spotting. **SEMI-GLOSS**—where higher sheen is required. **FLAT**—a velvet-like finish that is beautiful and restful, for offices, suites and dining rooms. These paints are enriched with *"Vitolized Oils"* for controlled penetration which keeps film *live*, tough and elastic.

WATERSPAR ENAMEL—for woodwork, furniture, metal trim. Smooth, china-like gloss resists marring and abrasion.

FLORHIDE—for floor surfaces. Quick-drying, tough, can be scrubbed frequently with soap solutions.

LAVAX MACHINERY ENAMEL—tough, durable and impervious to oil, grease, grime or dirt.

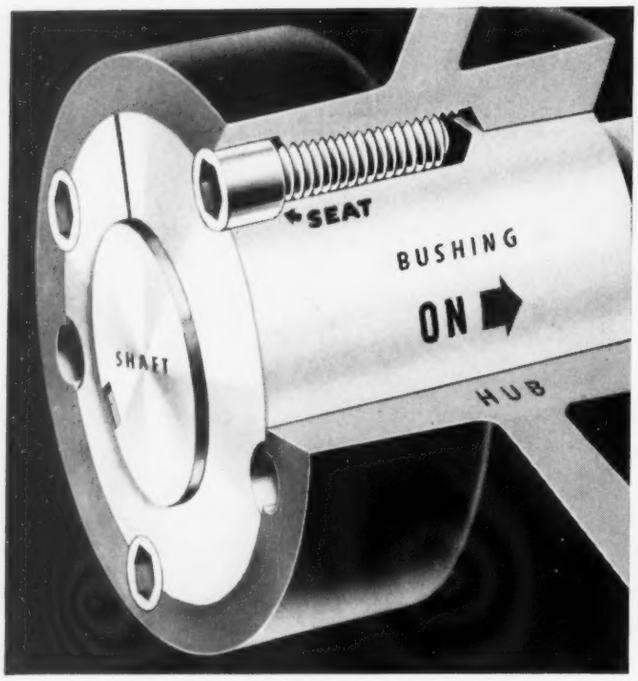
PITTSBURGH PAINTS

PITTSBURGH PLATE GLASS COMPANY, PITTSBURGH, PA.

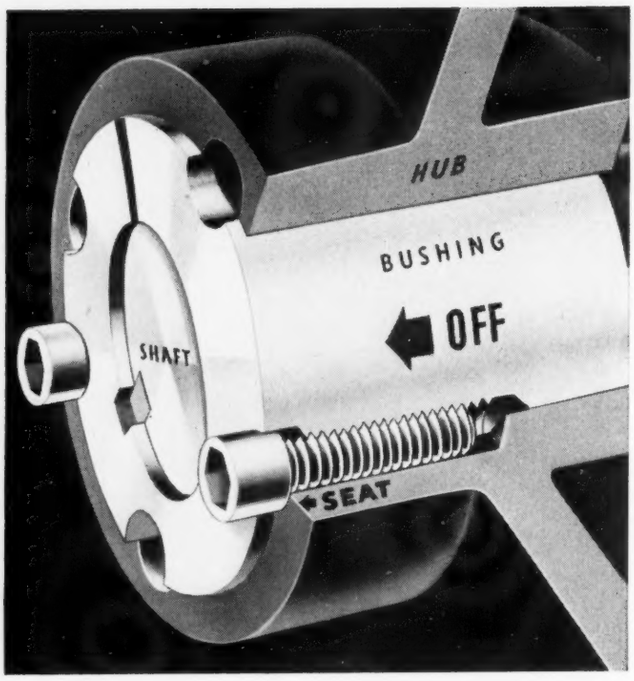
PITTSBURGH STANDS FOR QUALITY PAINT AND GLASS

HERE'S HOW IT WORKS

...SIMPLE, ISN'T IT?



Note that only the HUB is threaded. Screw-head seats itself against offset in bushing. As the screw is turned, the sheave is drawn up—wedged—with a firmness equivalent to a shrunk-on fit, whether the shaft is standard or normally undersize.



Note that here only the BUSHING is threaded. Screw-head seats itself against face of hub. As the screw is turned, the wedge is disengaged. Due to its steep taper, the bushing disengages with less effort than in any other sheave.

NEW TAPER-LOCK BRAND SHEAVE

Patent applied for

THE SYMBOL THAT CAME TO LIFE

The man who walks into your factory wearing this symbol is the living embodiment of a service which gives you the correct answer to your problems in efficient mechanical transmission of power. He is the Dodge Transmissioneer.

Here is the simplest, surest mechanism ever devised for holding wheels to shafts. No flange. No collar. No protruding parts. Easy on—easy off—and holds fast! Breaks all speed records in mounting and demounting. Slip it on, line it up and tighten *while sighting*... A complete range of stock sizes, from Dual Duty to C and D. For details call the Dodge Transmissioneer, your local Dodge distributor. Look for his name under "Power Transmission Equipment" in classified phone directory.

DODGE MANUFACTURING CORPORATION, MISHAWAKA, INDIANA

DODGE
MISHAWAKA

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NAME PLATES

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, ETCHING COMPANY OF AMERICA, 1520 MONTANA STREET, CHICAGO 14, ILLINOIS

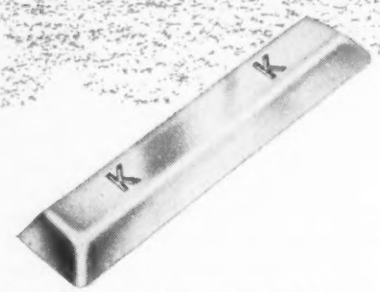
Cupola or open hearth!

FOUNDRIES . . . Charge that cupola with Keokuk Electro-Silvery!
STEEL MILLS . . . Block that heat with Keokuk Electro-Silvery!

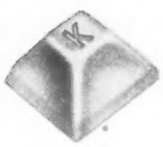
Here's the best way to add silicon! Keokuk Electro-Silvery, both *standard and alloy*, is manufactured under complete and constant control. This assures extremely accurate percentages of silicon, iron and other alloys, as desired—providing you with highest uniformity obtainable. Economical and time-saving! All can be handled by magnet. Write today . . . a Keokuk metallurgist will call at your convenience.

KEOKUK ELECTRO-Silvery

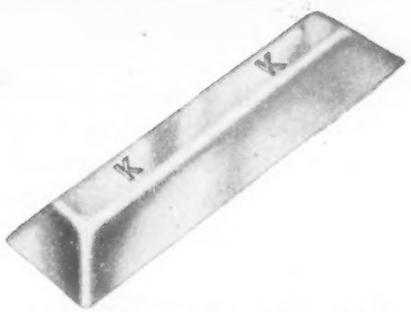
(HIGH SILICON PIG IRON)



30-lb. pigs for charging the cupola.



12½-lb. piglets for foundries so uniform in weight that they may be *charged by count.*



60-lb. pigs for blocking in the open hearth.

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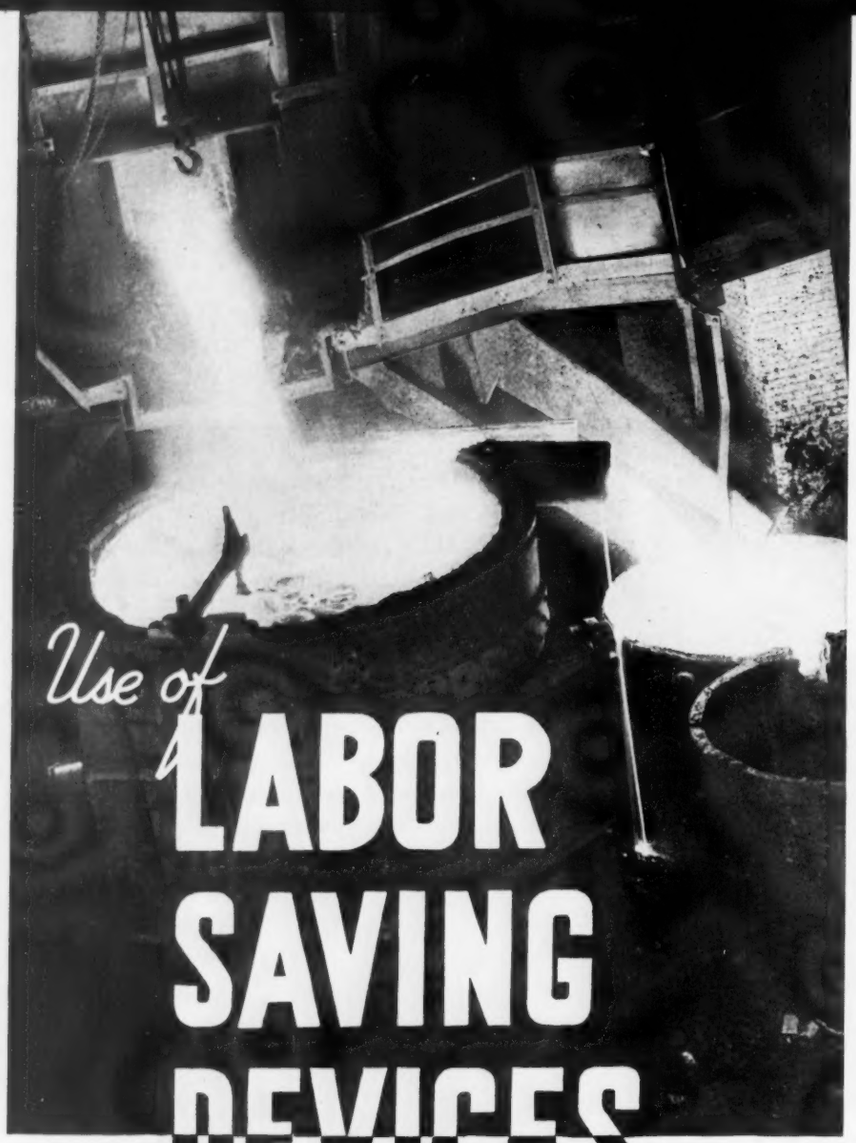


Tapping a 150-ton heat of steel from a basic open hearth furnace

Use of LABOR SAVING DEVICES in the Open Hearth Shop

By B. D. McCARTHY
Superintendent Open Hearth
Republic Steel Corp.
Youngstown, O.

Close study of furnace rebuilds discloses the importance of an effective method of slag removal. Heavy steel fabricated sled upon which slag is deposited is removed from slag pocket to beneath pit crane thus eliminating need for mechanical equipment. Novel method of flue dust removal is described

DURING the war one of the major problems in open-hearth shops was lack of capable labor to properly service our rebuilding facilities. It became necessary for us, at high operations, to increase the speed of rebuilding of furnaces and at the same time maintain high continuous operations which means high tonnage. In recognizing this factor a subcommittee of the open-hearth operating committee was appointed to analyze this subject for all of our plants. It was composed of an open-hearth superintendent, two engineers, a mason superintendent, a labor superintendent and an industrial engineer. Since the open-hearth superintendent was concerned with the overall picture it was only natural that he should be the chairman of the group, and the labor and mason superintendents were concerned because they had to use any equipment which might be recommended.

Various assignments were given to the members of the committee. The engineering department analyzed manufacturers' equipment which was on the market and available, and also studied layouts of all of our open-hearth shops and sizes of furnaces and their relations to ladle stands, building columns, and so forth. The industrial engineering department representative developed the costs of present methods and projected future costs with the equipment suggested.

One of the problems which was giving us trouble in the reduction of overall rebuilding time was the removal of slag. Our general practice had been to blast with some explosive or the use of air guns and then the removal either by hand or shovel of some kind. It developed that the best rebuild time that we were able to secure using these methods, was in the neighborhood of 10 to 12 days. Our aim was to secure 5 to 6 day rebuilds, less if possible, but it was found impracticable to go below 5 to 6 days. From the time fuel was off the furnace, slag in its hot state was a stumbling block to all crafts in performing their work due to its retaining of high heat. For this reason slag was given close attention. It was felt if all of the slag could be removed at one time and in one piece the heat factor would be greatly reduced and would permit the overall job to be completed in several days' less time. It was difficult to provide any single method which could be used in all shops because of the pit layouts with respect to ladle stands, building columns and pit floor elevation. For this reason, combinations of several methods were recommended.

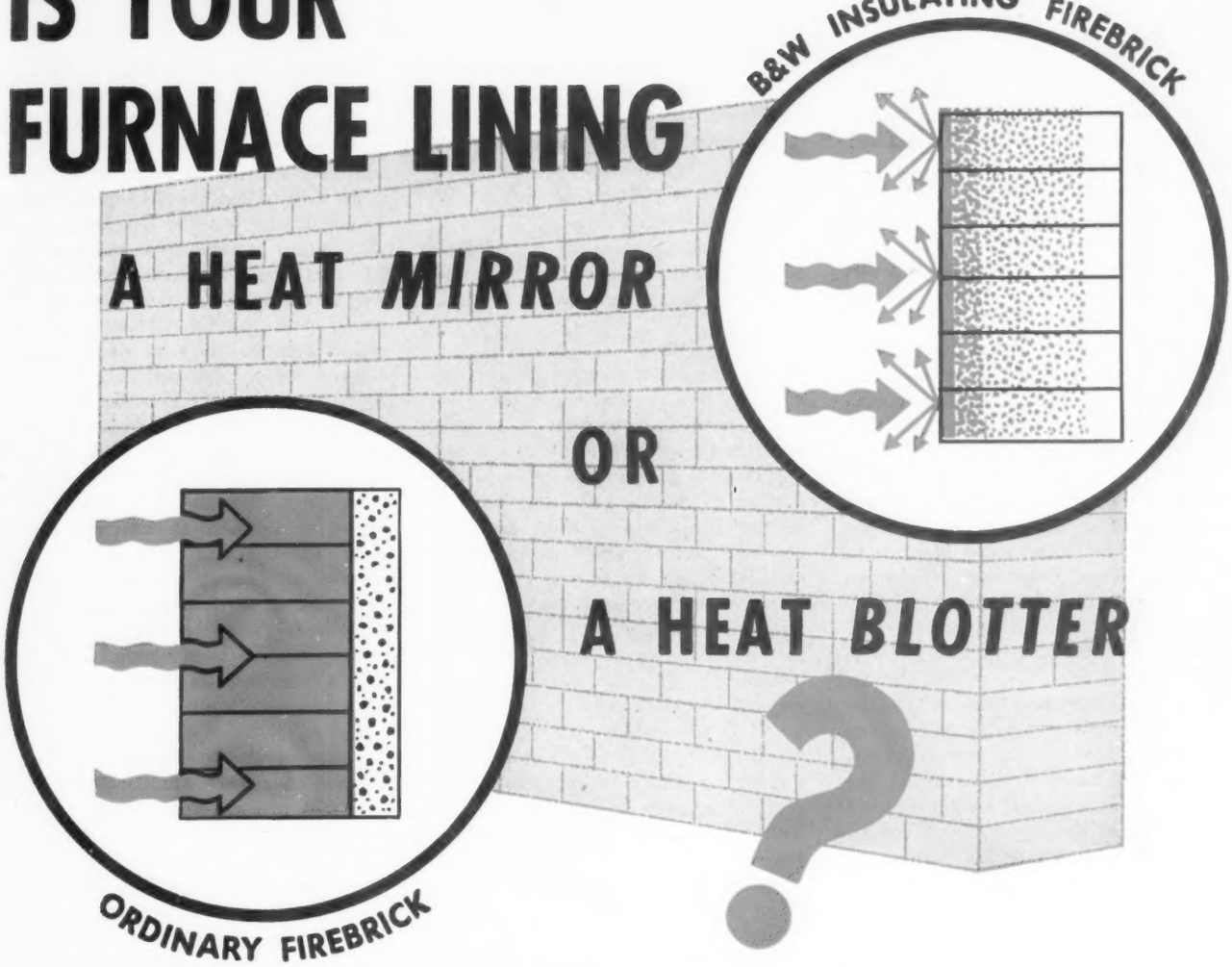
The one we believe to be the most effective is the car type arrangement which consists of a heavy steel fabricated sled or car with a steel plate and brick floor. The car or sled has two inverted tracks on its bottom which ride on 8-in. diameter balls. These in turn ride on two tracks extending the full length of the slag pockets inside and for a distance of 20 to 25 ft outside the slag pocket. By this arrangement the car is pulled out and spotted beneath the pit crane. When the car is in position in the slag pocket, the side and back sand walls are constructed resting on the car. The slag pocket bulkhead is also supported on the car. When the car, loaded with slag and brick sand walls or refuse brick is to be removed, it is pulled out by means of a steel sheave and cable tackle dead-

IS YOUR FURNACE LINING

A HEAT *MIRROR*

OR

A HEAT *BLOTTER*



When furnaces are constructed of dense firebrick, the walls and roof soak up heat because of their high heat-storage capacity . . . they act as "heat blotters". This results in serious heat losses—losses that are actually measurable in higher fuel costs.

But the low conductivity and low heat storage of B&W I.F.B. act as a "heat mirror"—the heat is thrown back into the charge where it can do useful work.

B&W I.F.B. come to temperature *on the surface* quickly. This means that heating-up time is cut—often as much as 60 to 70%. A shortened operating cycle and increased production result. Moreover, less fuel per cycle is required because B&W Insulating Firebrick minimize wasteful heat loss. In fact, fuel savings resulting from the use of B&W I.F.B. have often run as high as 33⅓%!

Even in continuous types of furnaces, this "heat mirror" principle results in appreciable fuel savings. Your local B&W Refractories Engineer can help you cut needless heat losses in your heat treating furnaces. A call or a post card will bring him . . . no obligation, of course.

R-235

Water-Tube Boilers, for Stationary Power Plants, for Marine Service . . . Water-Cooled Furnaces . . . Superheaters . . . Economizers . . . Air Heaters . . . Pulverized-Coal Equipment . . . Chain-Grate Stokers . . . Oil, Gas and Multifuel Burners . . . Seamless and Welded Tubes and Pipe . . . Refractories . . . . Process Equipment.

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ended on two building columns with the main pulling cable attached to a locomotive which permits pulling at right angles to the direction the slag is moving. In the event the slag sled is held fast in the pocket by slag curtains, the car is lifted on the front end and broken loose by taking a lift with cleavis and cable tackle and ladle crane. The balls and track used for reducing the friction when pulling the slag permits steel refuse boxes to be run into the pocket under the furnace uptakes and is a distinct advantage in removing furnace refuse.

Another method which is not as effective, but is being used satisfactorily, employs a steel fabricated sled in each pocket made up of two 4 x 16-in. slab runner sleds tied together with two 8 x 8-in. blooms. Round bars are welded in the outer ends for pulling connections. The back end of the slabs have upright billets welded in place to assist in gripping the slag body when pulling. The steel members of the sled, when in the pockets, are encased in brickwork to prevent burning. With this method, as with the car type, it is necessary to install solidly built sand walls which prevent leakage of the slag to the outer walls of the pocket and maintain clearance at the sand and slag pocket walls to permit the pulling of the slag. The pulling arrangement is essentially the same as expelling for the car type.

By the use of these methods slag which formerly took from 6 to 10 turns to remove now can be pulled in 3 hours from the time the cable is attached. While neither method is 100 per cent effective due in part to faulty materials and workmanship in building sand walls and permitting slag to penetrate the sand walls and adhere to the main walls of the pocket, reports indicate 75 per cent effectiveness which justifies the installation.

With methods such as just outlined much of the need for mechanical equipment has been eliminated.

Safety An Important Feature

Two important features are possible with this arrangement; one is the safety factor inasmuch as no men are required to be in the pocket at any time during the removal process; the other is that damage to existing refractory from the blasting is minimized. An indirect saving with the reduction in the use of mechanical equipment permits the salvage of more refractory brick which has been almost impossible to recover during the past several years. For with the use of mechanical equipment, such as bulldozers and shovels, almost no salvage material is recoverable. With the use of the boxes to hold the discarded material, there is practically no breakage except the spalling caused by their own weight falling into the boxes and being confined in the boxes permits them to be unloaded at any convenient location where there is an overhead or locomotive crane available. At low operations and during periods of strict economy, the salvage of refractory material is an important item.

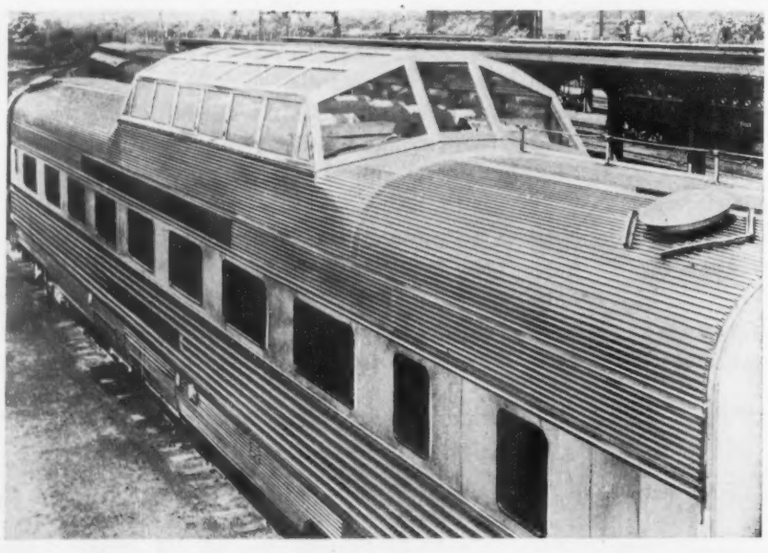
With improvement in rebuild slag removal operation, attention was given to the flue dust removal, which at best, is a disagreeable operation. It is hot and dirty and it is increasingly difficult to get men to perform this type of work. The first step was the development of some means to elminate as much of the flue dust from the checkers as possible. An arrangement of flue blowing by means of Schwartz flue blowers was installed between the rider walls on one furnace for a trial period. The flue blower consists of steam header pipes and a series of nozzles directed at an angle at the checker floor level, hooded to prevent clogging with the flue dust as it drops through above the nozzle. Steam is released at intervals which blows the flue dust from the checkers themselves, stirs up the amount which has fallen to the floor and expels a major portion from the checker chamber itself. This has been beneficial and the results obtained on the trial furnace have been satisfactory. However, in the actual rebuilding of the furnace and the cleaning of checkers which are not to be removed, there still remains a considerable portion of flue dust involved in the process.

In one of our shops we have installed a vacuum unit which indicates promise. It has been possible to reduce the number of man hours required in removing this material from the furnace. When flue dust is discharged into a railroad car adjacent to the open-hearth shop, the expense for trucks or other mechanical equipment to it from the furnace is reduced.

With open-hearth shops operating as nearly 100 per cent as is possible, considerable difficulty has been experienced in getting supplies and materials to the open-hearth floor. A reduction of the number of cars which had to be unloaded by the overhead charging floor cranes, already overtaxed, was imperative. This problem has been solved to some degree in our shops by building roadways or ramps over which materials could be brought by truck to the open-hearth charging floor and refuse removed through the same means. The problem of getting roof brick across the floor without interfering with the operation of the charging machine and charging cars in the case of rebuilds was solved through the use of driven conveyors which were elevated to permit the charging buggies to pass beneath.

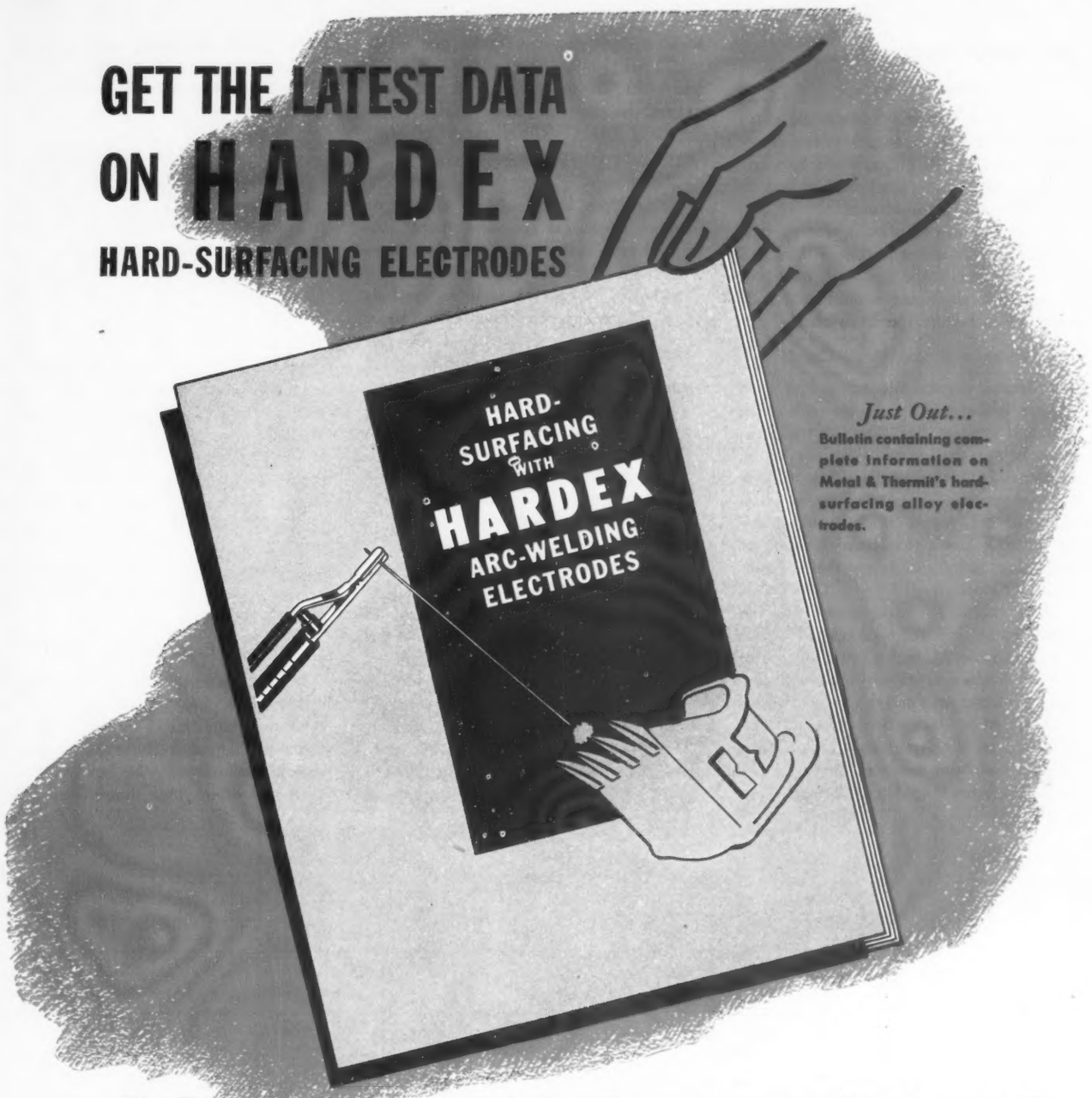
In some instances we have used conveyors to elevate refractory brick from

(*Please turn to Page* 148)



"GREENHOUSE" FOR RAIL PASSENGERS: Railroad passengers patronizing the Burlington road may have an opportunity to ride the above new stainless steel "penthouse" recently placed in service. The car, a regular streamlined coach, was remodeled to include a glass-enclosed dome incorporated in the roof. The 24 passengers accommodated sit with heads and shoulders above roof line, have a good view in every direction. Photo from Electro Metallurgical Co., New York

GET THE LATEST DATA ON HARDEX HARD-SURFACING ELECTRODES



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Bar Stock Records

(*Continued from Page* 95)

ments that do not have records the exact types and sizes of bar stock in the storeroom; and (6) to differentiate between obsolete and active stock and to aid in the utilization of the former.

These six reasons should warrant the reasonable investment in time and money to chart correctly the bar stock on hand. In addition, there are several other advantages to be derived from charts.

Using a Round Stock Chart

Unless a person looking at the card records is thoroughly familiar with every size and type of bar stock in the rack, chances are that certain cards may be overlooked, time wasted, and new stock ordered unnecessarily. Reference to a chart of all round stock would limit the possible steels that could be used to those few sizes and types that are actually in stock.

Only round stock is shown on the chart in Fig. 3; however, rounds, squares, hexagon, octagon, and all other types of bar stock designated by one dimension can be placed on this type of chart. Size is indicated on the vertical column: Type of metal on the horizontal column. Size column has been repeated several times to facilitate reading. Alternate steels have been grouped together under one heading. Thus, 1020, CD, X131CD (C117), and 1020 HR are all grouped under the general heading of "Low Carbon Carburizing Steels." Other types of steel have been grouped similarly.

The letter A is used to indicate active stock and the letter S slow moving or inactive stock. Of course, symbols can be used to indicate things other than those shown on this chart. (See section on "Symbols"). Chart as well as symbols were all printed from one master sheet and reproduced on a "blue-line" machine. Chart is revised monthly. If revisions are only a few in number, charts throughout the shop are withdrawn, revised by hand, and then redistributed. Whenever major changes are to be made, all old charts are destroyed. Master sheet then is revised and the charts reprinted. New charts then are distributed.

Bar stock records in trays, on cards, or in ledger form do not give a complete, over-all picture of bar stock on hand. Nor, for that matter, are they intended to do so. For example: Bar stock is needed to make a shaft that finishes 1.660 in. on the largest outside diameter. According to the specification sheet, the correct material is SAE 4145 heat treated to 235-311 brinell, or any approved alternate steel. Before sufficient material to fill the job is found, reference may have to be made to the following cards (assuming that the company in question uses NE 8642, 8744, 9442, and 9445 as alternates for SAE 4145):

1-11/16 in. dia. 4145 CDHT
1-¾ in. dia. 4145 HRHT
1-¾ in. dia. 4145 CDHT
1-11/16 in. dia. 8642 CDHT
1-11/16 in. dia. 8744 CDHT
1-11/16 in. dia. 9442 CDHT
1-11/16 in. dia. 9445 CDHT

1-¾ in. dia. 8642 HRHT
1-¾ in. dia. 8744 HRHT
1-¾ in. dia. 9442 HRHT
1-¾ in. dia. 9445 HRHT
1-¾ in. dia. 8642 CDHT
1-¾ in. dia. 8744 CDHT
1-¾ in. dia. 9442 CDHT
1-¾ in. dia. 9445 CDHT

Many of these cards may have zero balances, many may have only a few pounds, and many may not even be in stock. But all cards must be checked to see if there is enough stock on any of them to make the desired parts. If the factory making this part also stocks 4145 HR annealed and alternates, all these cards may have to be checked, because annealed stock often can be heat treated in the plant if there is no heat treated stock available.

Using Cards for Flat Stock

Difficulties encountered in looking for round stock are multiplied when flat stock or tubing has to be used. In these forms of bar stock there is not one dimension to contend with but two dimensions and often three dimensions. Take

TOOL STEELS REGULARLY CARRIED IN STOCK

● - ACTIVE STOCK O - SLOW MOVING STOCK

STENTOR TOOL STEEL
PAINTED - GRAY

ROUND STOCK

5/8	●	1-3/4	●	2-3/4	O	5	●
3/4	●	1-7/8	O	2-7/8	O	6	O
1	●	2	●	3	●		
1-1/8	●	2-1/8	●	3-1/4	O		
1-1/4	●	2-1/4	O	3-1/2	O		
1-3/8	●	2-3/8	O	3-3/4	O		
1-1/2	●	2-1/2	●	4	O		
1-5/8	●	2-5/8	●	4-1/2	●		

SQUARE STOCK

3/4	O	1	●	1-1/2	O	2	●

FLAT STOCK

5/8 X 1-1/2	●	1 X 2	●
3/4 X 2	●	1 X 3	●

REX AAA TOOL STEEL
PAINTED - GRAY - RED

ROUND STOCK

3/4	O	1-3/4	●	2-1/2	O	3-3/4	●
1	O	2	O	2-3/4	●		
1-1/2	O	2-1/4	●	3	O		

FLAT STOCK

1/2 X 1	O	1 X 1-1/2	O
5/8 X 1-1/2	O	1 X 2	●
3/4 X 2	O	1 X 3-1/2	O
3/4 X 3	O	1 X 4	O

MISCELLANEOUS TOOL STEELS

MOGUL MOLY TOOL STEEL — PAINTED GRAY & BLUE
REX MM TOOL STEEL — PAINTED GRAY & BLACK
SUPREMUS TOOL STEEL — PAINTED GRAY & ORANGE

ROUND STOCK

	3/4	7/8	1-1/4	1-1/2	1-5/8	1-3/4	2-1/4	2-3/4
MOGUL MOLY			●	●	O			
REX MM	O			●		O	O	O
SUPREMUS		●						

②

STOCK LIST OF ROUND STOCK – BRONZE & STEEL

A = ACTIVE STOCK
S = SLOW MOVING STOCK

SIZE	LOW CARBON CARBURIZING STEEL				CASE HARDENING ALLOY STEEL						TRU-HARDENING ALLOY STEEL PURCHASED IN ANNEALED CONDITION							SIZE	TRU-HARDENING STEEL PURCHASED HEAT TREATED 235-311 BRINELL										KEY STOCK		SIZE	BRONZE CAST			BRONZE ROUGH TURNED			BRASS ROD
	1020 C.D.	X1314 C.D.	1020 H.R.		3120 C.D.	4615 C.D.	N.E. 8620 C.D.	3120 H.R.	4615 H.R.	N.E. 8620 H.R.	N.E. 8642 C.D.	N.E. 9443 C.D.	3140 4145 H.R.		N.E. 8642 H.R.	N.E. 8744 H.R.	9442 H.R.		3140 4145 CDHT		N.E. 8642 CDHT	N.E. 8744 CDHT	3140 4145 HRHT		N.E. 8642 HRHT	N.E. 8744 HRHT	N.E. 9490 HRHT	3135 C.D.	3135 H.R.		½	¾	1	1½	2	3	4	4688	4616	4616		
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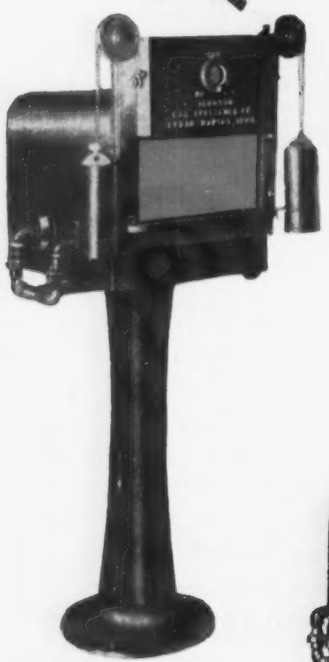
REVISED
2/1/45
3/1/45

③

Heat-Treat High-Speed Steels, Dies and Tools in your Own Plant with Quick Acting JOHNSON Furnaces

Reduce TOOLROOM BOTTLENECKS

Increase plant efficiency by cutting down time lost waiting for tools. Install Quick Acting JOHNSON Furnaces in your tool room and shop. Ready for operation on short notice they get the job done quickly and economically. Powerful burners fire under hearth to produce high uniform temperatures at remarkably low fuel cost. Designed especially for high-speed steels . . . equally efficient for hardening ANY steel tools, dies or small metal parts. Write today for literature giving complete specifications. Johnson engineers will help you select the type and size that meet your particular requirements.



No. 130A
Hi-Speed Furnace

Furnished in two temperature ranges. 4-Burner Unit for 1400-2000°F. or 6 Burner for 1800-2400°F. Counter-balanced door opens upwards. Large firebox 7¾ x 13 x 16½.

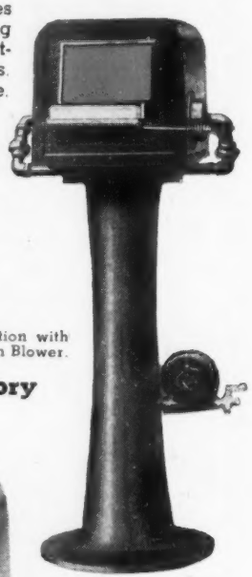
4-Burner $295.
6-Burner $325.

No. 130 Hi-Speed Furnace

Consistently develops 2300°F. in 25 minutes to produce clean, scale-free steel at low cost. Firebox 5½ x 13 x 13½.

$255.00

COMPLETE JOHNSON CATALOG gives detailed information on all cost-saving Johnson Furnaces for pot-hardening, melting, annealing and heat-treating operations. Industrial gas burners for every purpose. Write for your free copy.



No. 120 Hi-Speed Furnace

Reaches 1500°F. in 5 minutes. 2300° in 30 minutes to harden ANY steels. Firebox 5 x 7¾x13½.

$129.50

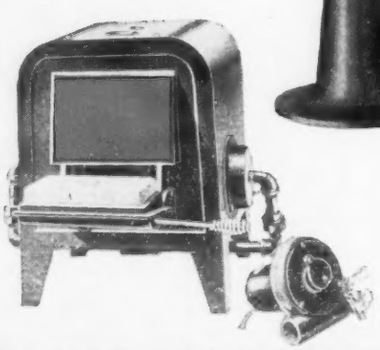
Furnaces shown equipped, ready for action with Carbofrax Hearth, G.E. Motor and Johnson Blower.

All Prices F. O. B. Factory

No. 70 Hi-Speed Bench Furnace

Delivers 2250°F. in 30 minutes from a COLD START. Temperature range easily controlled with accuracy. Firebox 5 x 7 ¾ x 9.

$89.50



JOHNSON GAS APPLIANCE CO.
573 E. AVE., N.W., Cedar Rapids, Iowa

Please send me full information on Quick Acting Johnson Heat-Treating Furnaces ☐

Complete Johnson Furnace Catalog ☐

Name_____

Address_____

City_____ State_____

JOHNSON GAS APPLIANCE CO.
573 E. AVENUE, N. W., CEDAR RAPIDS, IOWA
Established 1901

for example a cover plate that finishes ⅝ x 1¾ x 2 in. long. First three cards that would be checked are ⅝ x 1¾ in. cold drawn, ⅝ x 2 in. cold drawn, and 1¾ in. x 2 in. cold drawn. If none of these sizes are available, it may be necessary to go oversize. Allowing only ⅛ in. over on any one of the three dimensions, the following are the possible sizes of cold drawn stock that can be used:

⅝ x 1 13/16 in.
⅝ x 1⅞ in.
⅝ x 2 1/16 in.
⅝ x 2⅛ in.
11/16 x 1¾ in.
¾ x 1¾ in.
11/16 x 2 in.
¾ x 2 in.
1¾ x 2 1/16 in.
1¾ x 2⅛ in.
1 13/16 x 2 in.
1⅞ x 2 in.

And if hot rolled as well as cold rolled is stocked, or if flat stock is carried in several alternate steels, the complexity of using records alone to find material for parts becomes apparent. It should also be apparent that quite often new stock is ordered because regular stock is overlooked, or because a close size of regular stock that could have been used was not discovered.

Use of cards for flat stock is complicated by the fact that cards are filed by the thick dimension and then by the wide dimension. Thus, records for flat stock would be filed in the following manner:

¾ x 1 in.
¾ x 1¼ in.
¾ x 1½ in.
¾ x 2 in.
¾ x 2¼ in.
¾ x 4 in.
¾ x 7 in.
¾ x 12 in.
13/16 x 1 in.
13/16 x 2 in.
etc.

Sizes ¾ x 1 in. and 13/16 x 1 in. are different only by 1/16-in. in thickness; yet they are filed several cards apart, perhaps even in different trays. This, of course, is an inherent characteristic of stock records, and shuffling the cards or rearranging them would be to little avail.

The same situation arises with tubing. Tubing cards are usually filed numerically by the outside diameter and then within each outside diameter the several inside diameters or wall thicknesses are filed. Two tubes with the identical wall thickness but with 1/32-in. difference in the outside diameter may be filed in entirely different trays. (It might be noted here that in record-keeping of tubing, standard practice should be that of maintaining cards by the outside diameter and the wall thickness, instead of by inside and outside diameters. Wall thicknesses are standard: Inside diameters are not. Ten different sizes of tubing with the same wall thickness would have ten entirely different inside diameters.)

Chart in Fig. 1 is for flat and square stock. (Basis for including square stock on this chart is the use of two dimensions to indicate square stock; hence 2 x 2 in. for 2 in. square.) On this chart the horizontal line indicates width of flat stock: Vertical line indicates the thickness. To find a size of stock on this chart, draw an imaginary line across the thick dimension and another imaginary line down the width dimension, and the point of intersection is the size desired.

Chart was drawn on a master sheet without symbols (by a "blue line" machine) as shown here. Unlike chart shown in Fig. 3, where the type of metal is indicated on the chart, here the type of steel must be indicated by the symbol used on the chart. Symbols, filled in by hand in either blue or red pencil, are used to indicate the different types of steel. Blue indicates active stock: Red indicates inactive stock. Chart is distributed throughout the shop and revised every month. Revisions are made by hand. Obsolete symbols are erased and additions that are necessary are added. After several months, charts are withdrawn, new blank charts run off, symbols filled in by hand, and charts once more distributed.

Chart in Fig. 2 is a combination chart on which flats, squares, and rounds are indicated. Such a chart can be used where stock lists are small, or for special metals such as tool steel, stainless steel, and the like.

Original of this chart was printed on a "blue-line" machine, and symbols and chart reproduced at the same time. Stock listed on this chart is of a stable nature; hence charts are changed only once or twice a year. At that time new charts are distributed and the old ones destroyed.

Inventory Control Simplified

Charts point out visually and graphically the shortcomings of any individual bar stock situation. In Fig. 3 there are several clear examples of duplication of stock. There are seven different kinds of 1⅜ in. diameter "Tru-Hardening steel purchased heat treated to 235-311 brinell." As all of these steels are alternates and are used interchangeably there should be no reason for the diversity of types in this one size.

It must be remembered that each size in each different type of metal, no matter how small the balance, represents a good deal of expensive paper work. For each of these sizes there is one cost card, one production card, and often one stores record. And after every inventory these cards are handled and adjusted. Good stock control calls for a minimum of sizes and types. Duplication of sizes as pointed out above is bad stock control and should be avoided.

Charts can aid in reducing duplication of sizes by showing graphically where these duplications appear. Using the 1⅜ in. diameter stock mentioned above as an example, we can see how a chart can easily help dispose of unwanted stock.

Let"s say there is an order for 500 ft of this stock to make 300 shafts. The order calls for 1⅜ in. diameter 4145 HR heat treated. From Fig. 3 it can be seen that the desired material is available. However, chart also shows that there are 3140, 4145, 8642, 8744, all cold drawn heat treated, all of which are slow-moving.

A check of these cards will indicate that the four cards combined just enough stock to fill the order. Good stock control would indicate that the four sizes of CDHT should be used instead of HRHT even though the cold drawn stock is more expensive.

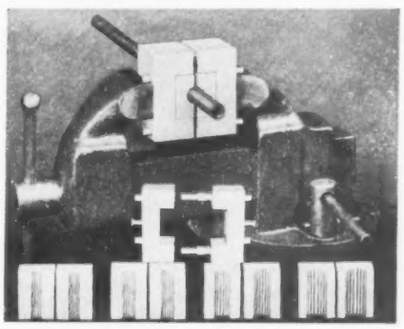
The fact that by so doing four cards will be eliminated, plus the fact that if the material is not used it may be sold for scrap, warrant the substitution. Without a chart this move might have been overlooked.

There is no limit to the variety and diversity of symbols that can be used on charts to indicate various types of information, The only limiting factors are physical space limitations of the chart and the personal ingenuity of the persons

Steel Inserts in Retainer Blocks Hold Pipe Securely

Pipe gripping device illustrated holds small pipe in any vise without crushing or marring surface of threads and permits fast handling of pipe without damage.

Devise consists of two light alloy retainer blocks in which hardened steel in-



serts are slipped to hold various pipe sizes. Inserts are made in ⅛, ¼, ⅜ and ½-in. sizes. Springs automatically spread blocks apart when the vise is opened. Assembly can be positioned horizontally or vertically and is held by pins. Maker is J. A. Campbell Co., 645 East Wardlow road, Long Beach 7, Calif.

RB&W CAP SCREWS

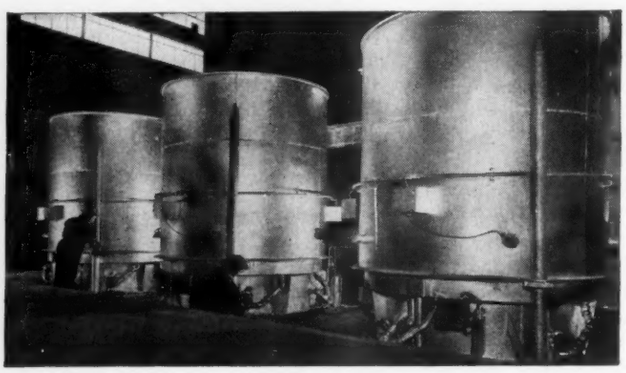
FIT FOR REFINED COMPANY

Furnished Bright or Hi-Carb Heat Treated, RB&W Cap Screws give your product maximum fastener strength and finest appearance... and they are held to close tolerances that just a few short years ago were considered impossible for a commercial product.

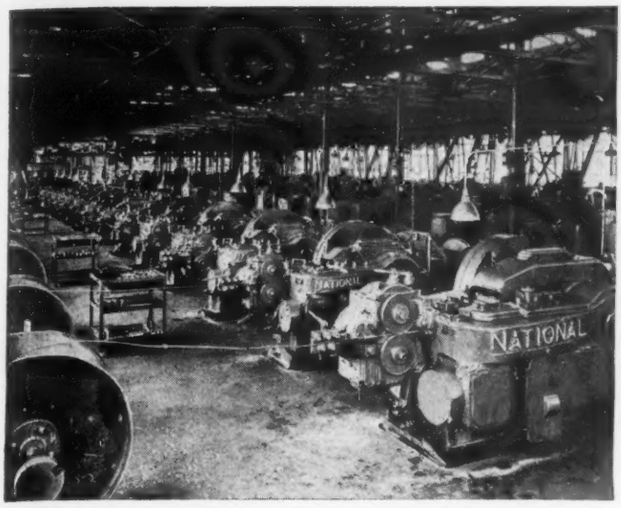
Uniform physical properties are assured by scientific selection and preparation of raw material, use of the latest type of modern equipment and a system of quality control followed throughout production.

COMPLETE RANGE RB&W Cap Screws are produced in a size range up to 1" x 8" and are stocked through 1" x 6" in Bright and ¾" in Hi-Carb Heat Treated. The Heat Treated screws have a black, satin-lustre finish obtained by a special RB&W process.

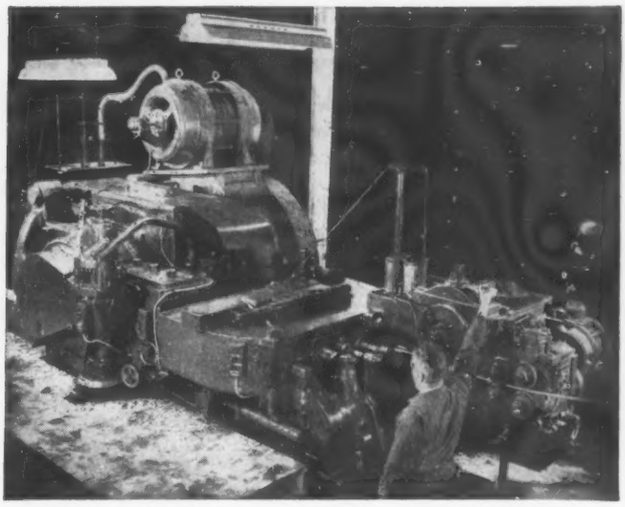
QUALITY CONTROL — Mechanical and physical examination of raw material plus continuous inspection at every stage of manufacture provide assurance of uniformity and top quality.



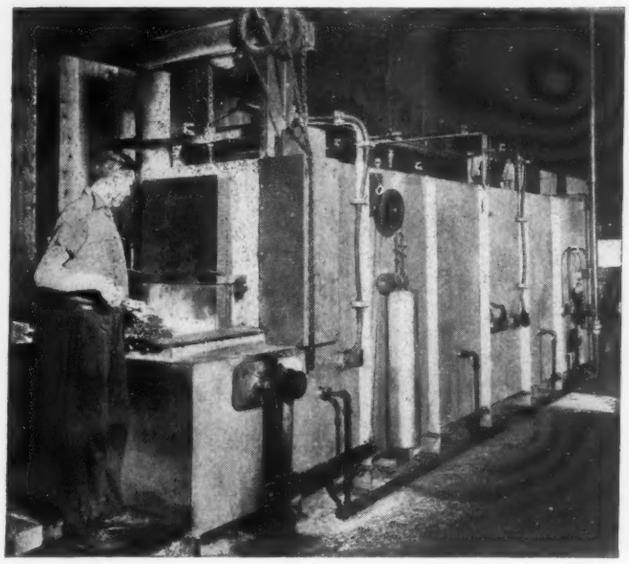
PREPARATION — Hi-carbon and alloy steels are prepared for cold-forming in these spheroidizing furnaces, which improve the microstructure of the material.



PRODUCTION — Impressive tonnage output daily comes from this battery of machines, representing only a fraction of RB&W Cap Screw manufacturing capacity.



LARGEST MACHINES — These machines have capacity for producing Cap Screws cold up to 1" diameter and offer maximum attainment in close tolerance work.



UNIFORM TREATMENT — All RB&W Hi-Carb Cap Screws are hardened in atmospheric-controlled furnaces. A very close automatic temperature control and other features provide uniform and thorough heating, with complete freedom from scale.

TEMPERING — After oil quenching, RB&W Hi-Carb screws are tempered in batch type draw furnaces. The final step is the application of the special satin finish which distinguishes this high strength product.

RB&W The complete quality line

101 YEARS *Making strong the things that make America strong*

Plants at: Port Chester, N.Y., Coraopolis, Pa., Rock Falls, Ill. *Sales Offices at:* Philadelphia, Detroit, Chicago, Chattanooga, Los Angeles, Portland, Seattle. *Distributors* from coast to coast. Order through your distributor and get prompt service for your normal needs from his stocks. Also, the industry's most complete, easiest-to-use catalog.

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

drawing up the chart. Following are a few suggested means of using symbols on charts:

Letters—Where the chart does not indicate types of metal as in Fig. 1, letters can do so. *Upper case* or *lower case, italic* or *regular type, bold face* or *light face* can be used to indicate active or inactive stock. On charts such as Figs. 2 and 3 where the type of metal is indicated by the chart itself, letters can be used to indicate approximate weights. (A— up to 50 lb, B—50-100 lb, C—100 -200 lb, etc.)

Numbers—On charts where the type of steel is indicated, actual weights can be lettered in to show card balances. Inactive stock can be pointed out by circling numbers. Where type of metal must be indicated by the symbol used (as in Fig.1) different types of metal can be shown by the use of different colors. Thus, red numerals would mean 1020 CD, blue numerals would mean 1112 CD, etc. Inactive stock can be indicated by the use of a circle around the numbers.

Figures—Different devices, such as dots, circles, checks, asterisks, squares, crosses, and countless others can be used. Different colored figures can indicate approximate balance on hand or the type of metal. Figures can be circled to denote active or inactive stock.

How To Design And Maintain Charts

First step is that of determining the number of charts needed and the form they will take. If the bulk of stock is round with only a few flat sizes and a few squares, a combination chart (Fig.2) can be used. If there are many flat sizes, chart in Fig.1 would be needed. Decision must be made solely on individual plant needs and problems.

Next, decision should be made as to the information that will appear on the charts and the symbols that will be used to convey this information. Chart or charts should then be drawn. Chart should include all sizes on hand, all sizes stocked in the past, and all sizes that may be stocked in the future. This should be done so that the charts will not have to be re-drawn when new sizes are received.

Information should be transferred from card records to sheets of paper, and then transferred on to charts before or after charts are printed.

In some cases where large quantities are to be printed, it would take too long to print the charts blank and then fill in information by hand. However, where few charts are needed and where charts are frequently devised, it would be economical to run off large numbers of blank charts and fill in information by hand. Old charts then can be withdrawn and new ones issued whenever revisions are to be made.

Question of whether to fill in charts before or after printing is largely an individual problem depending on quantity of charts printed, means of printing charts, number of revisions and fequency of revisions, uses to which charts are put, and several other individual factors. To maintain charts, a record should be kept of all changes. Changes can be transferred to charts whenever revisions are made.

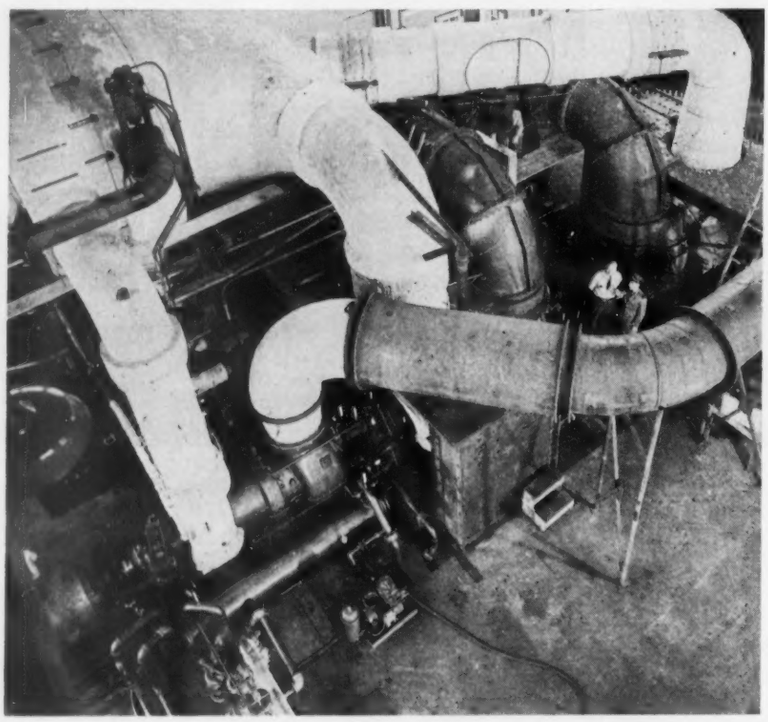
No matter how many different kinds of charts are used, all should be of standard width so they can be kept together in a folder or a loose-leaf note book. Length of charts may vary because they can always be folded to a standard length. (In drawing charts always draw in punch holes on one side of the sheet.)

Charts should be distributed throughout the entire shop but a careful record should be kept of the location of each chart. If revisions are made, all charts should be revised and accounted for. Date of issue should be placed on all charts, and revision dates should be recorded similarly. If charts are to be revised periodically, an expiration date can be included.

Charts can be reproduced in most shops with printing facilities that may be available. Stencils, mimeographs, "blue lines", blue prints, and similar reproduction media are suitable for printing charts.

By indicating where there are too many sizes and where there is obsolete stock, charts can aid in reducing stock to a limited number of desired sizes and types. In anticipation of the days when regular steels will be available in quantity in desired sizes, charts can serve as a guide in arriving at eventual standards for sizes and types of bar stock.

Advantages of stock control charts are further enhanced by the fact that they are inexpensive to produce and relatively simple to make and maintain.



HIGH-TEMPERATURE GAS TURBINE: Recent successful operation of this experimental gas-turbine plant at a temperature of 1350 degrees F, leads designers and builders, Allis-Chalmers of Milwaukee, to foresee a promising future for gas turbines in propulsion units, railroad engines, aircraft and marine units included. Installed in the U.S. Naval engineering experiment station, Annapolis, plant was set up for eventual operation with hot gas at a temperature of 1500 degrees. The 3500 hp multistage unit was developed for continuous power generation. Plant here is arranged with two turbines operating in parallel, one supplying power required to drive the compressor, the other furnishing power to meet requirements of driven machine or dynamometer. Fresh air enters compressor at 40,000 cfpm, is discharged at pressure of 45 psi to the heat exchanger

A USER TELLS WHY MEEHANITE

Air Products, Inc., Chattanooga, Tennessee, manufacturers of a unique oxygen generator, make extensive use of Meehanite Castings as illustrated.

When asked to give their reasons, they tabulated an interesting report covering important parts for their expansion engine.

The Meehanite Castings used in the unit are displayed and the completed equipment is shown at lower right.

Air Products
...INCORPORATED

MANUFACTURERS OF
EQUIPMENT FOR THE PRODUCTION AND USE OF OXYGEN · NITROGEN · HYDROGEN · ACETYLENE

MANUFACTURERS ROAD
CHATTANOOGA 5, TENN.

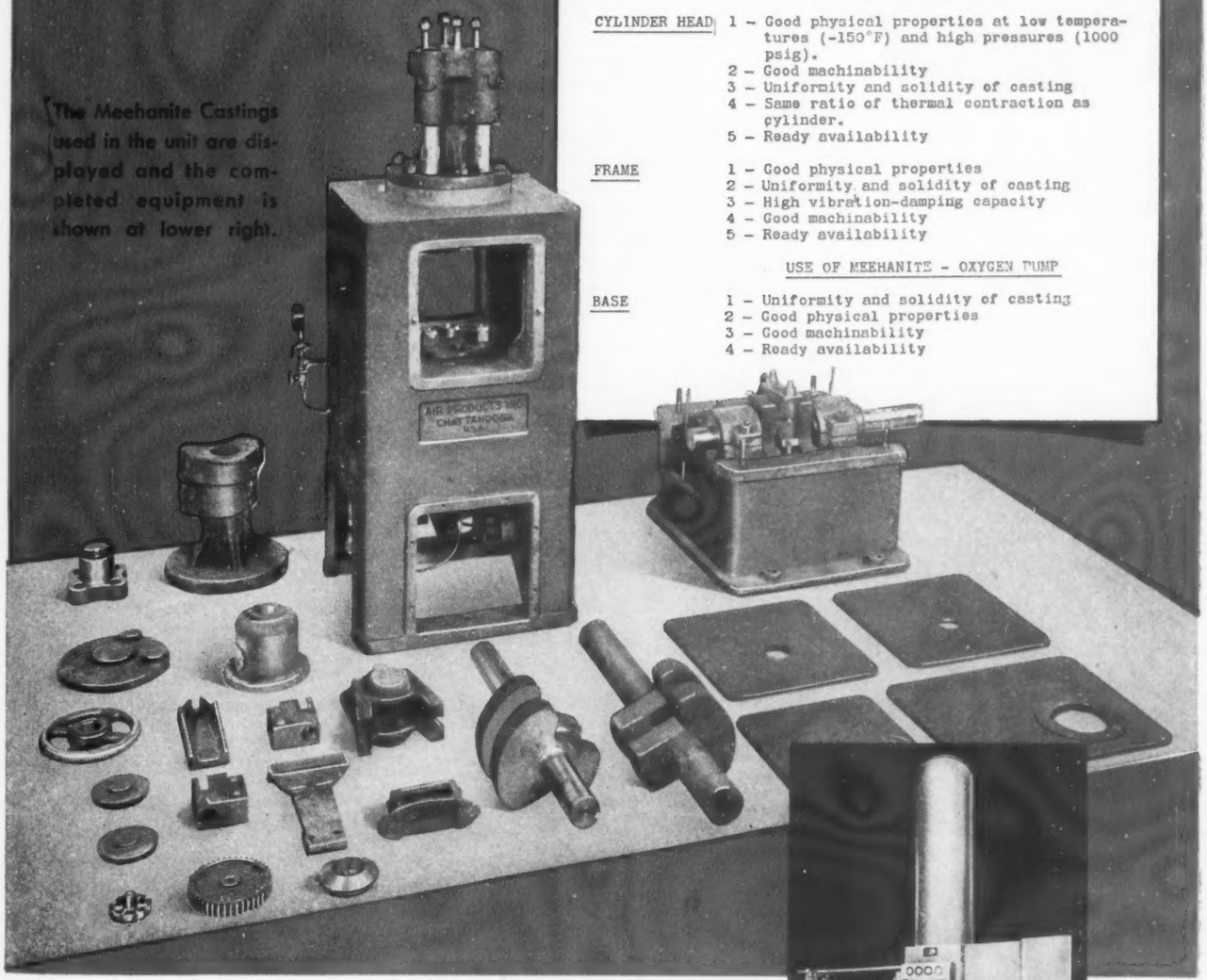
December 29, 1945

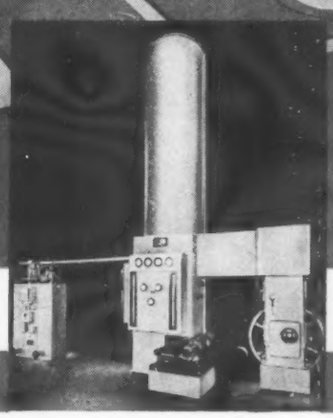
USE OF MEEHANITE - EXPANSION ENGINE

CRANKSHAFT	1 – Used to replace forged-steel crankshafts, which are difficult to procure. 2 – Easier to machine 3 – Less expensive 4 – Satisfactory shear strength 5 – Uniform solidity
CYLINDER	1 – Good wear characteristics at low temperatures (-150°F) and high pressures (1000 psig). 2 – Good physical properties at low temperatures (-150°F). 3 – Good machinability 4 – Uniformity and solidity of casting 5 – Ready availability
CYLINDER HEAD	1 – Good physical properties at low temperatures (-150°F) and high pressures (1000 psig). 2 – Good machinability 3 – Uniformity and solidity of casting 4 – Same ratio of thermal contraction as cylinder. 5 – Ready availability
FRAME	1 – Good physical properties 2 – Uniformity and solidity of casting 3 – High vibration-damping capacity 4 – Good machinability 5 – Ready availability

USE OF MEEHANITE - OXYGEN PUMP

BASE	1 – Uniformity and solidity of casting 2 – Good physical properties 3 – Good machinability 4 – Ready availability





MEEHANITE RESEARCH INSTITUTE
NEW ROCHELLE, N. Y.

INDUSTRIAL EQUIPMENT

Photoelectric Counter

Combining use of a photoelectronic circuit with an optical system, the Shadowcount, developed by Autotron Co., Danville, Ill, is designed to provide a method of high speed, accurate counting. Count is taken by short light beam

focused through a tube so objects fed through the open end of the tube break the beam.

Maximum counting speed of unit is 1000 per min, necessitating use of spacing device. Recommended installation is a place where pieces may fall directly or by means of a chute into guide tube of counter, thus hoppers and spacers usually are not required. Stock room adaptations would require a hopper and spacer.

By setting counter beam off center, it is possible to count certain objects without use of a spacer, washers for example. Where mounting space is limited or where fragile pieces make impractical use of a feed tube, an external phototube in separate housing and connected to counter by cable, may be used.

Steel 4/8/46; *Item No.* 9129

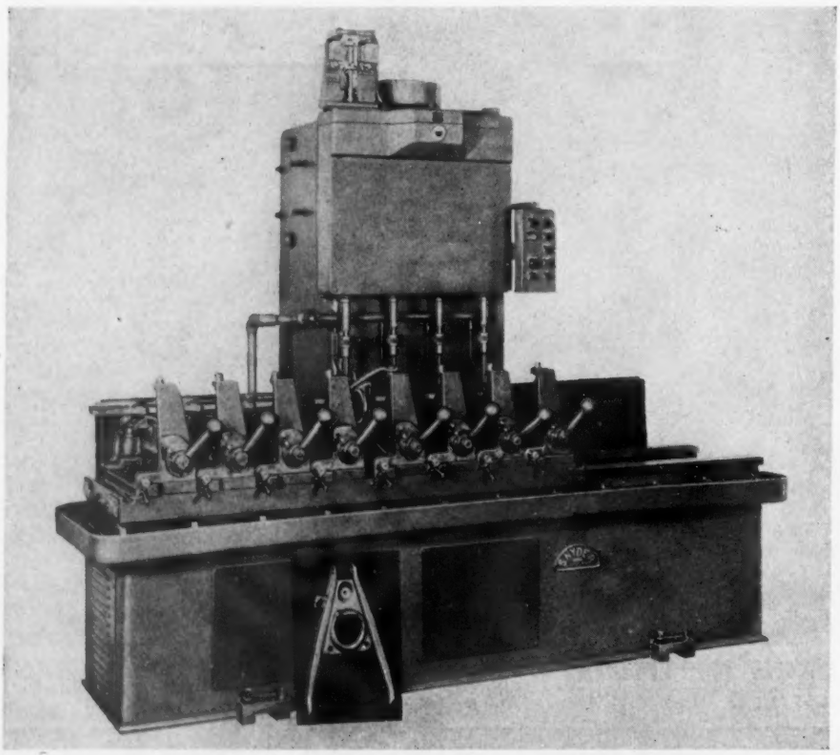
Tapping Machine

A four-spindle tapping machine for tapping automotive front wheel support brackets is designed and built by Snyder Tool & Engineering Co., 3400 East Lafayette, Detroit 7.

The machine has a welded steel column containing the tapping spindle drive motor, leadscrew mechanism and the necessary depth control limit switches. Fixture table is equipped with eight fixtures, thereby making it possible to work on four parts while four finished parts are unloaded and the fixtures reloaded. Fixtures and the table move hydraulically from the loading to the working positions.

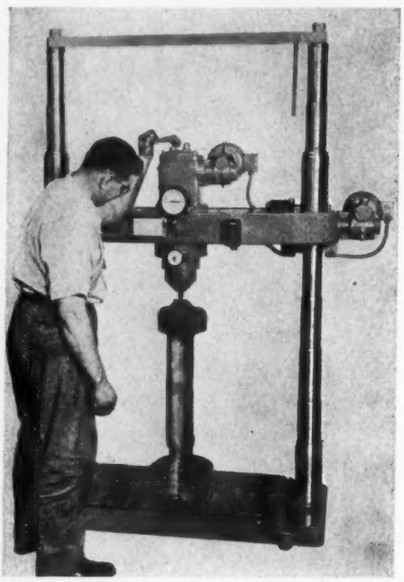
Base of the machine contains the hydraulic equipment for moving the table and the fixtures back and forth. The lubricant for the taps is contained in the lower portion of the column.

Steel 4/8/46; *Item No.* 9112



Testing Machine

A machine for the brinell testing of heavy and hard to handle specimens, is announced by Steel City Testing Laboratory, 8843 Livernois, Detroit 4. A hardened steel plate on the base of the machine provides the proper foundation for testing and is only 3 in. from the floor. It is identified as Type A-4 and can be set up in an assembly line or any other position to suit the test requirements. Cross head motor is operated with a reversible switch which is located for convenient operation. Pressure upon the head is hydraulically operated. It comes equipped with either standard brinell microscope for reading diameter of impression, or with direct reading attachment. Type A-4 is furnished with overload protection—screws have collapsible covers. Two sizes, 3 ft 8 in. between standards for testing specimens 51 in. (maximum) in height and 22 in. between standards for testing specimens 24 in. (maximum) in height are available.



Steel 4/8/46; *Item No.* 9113

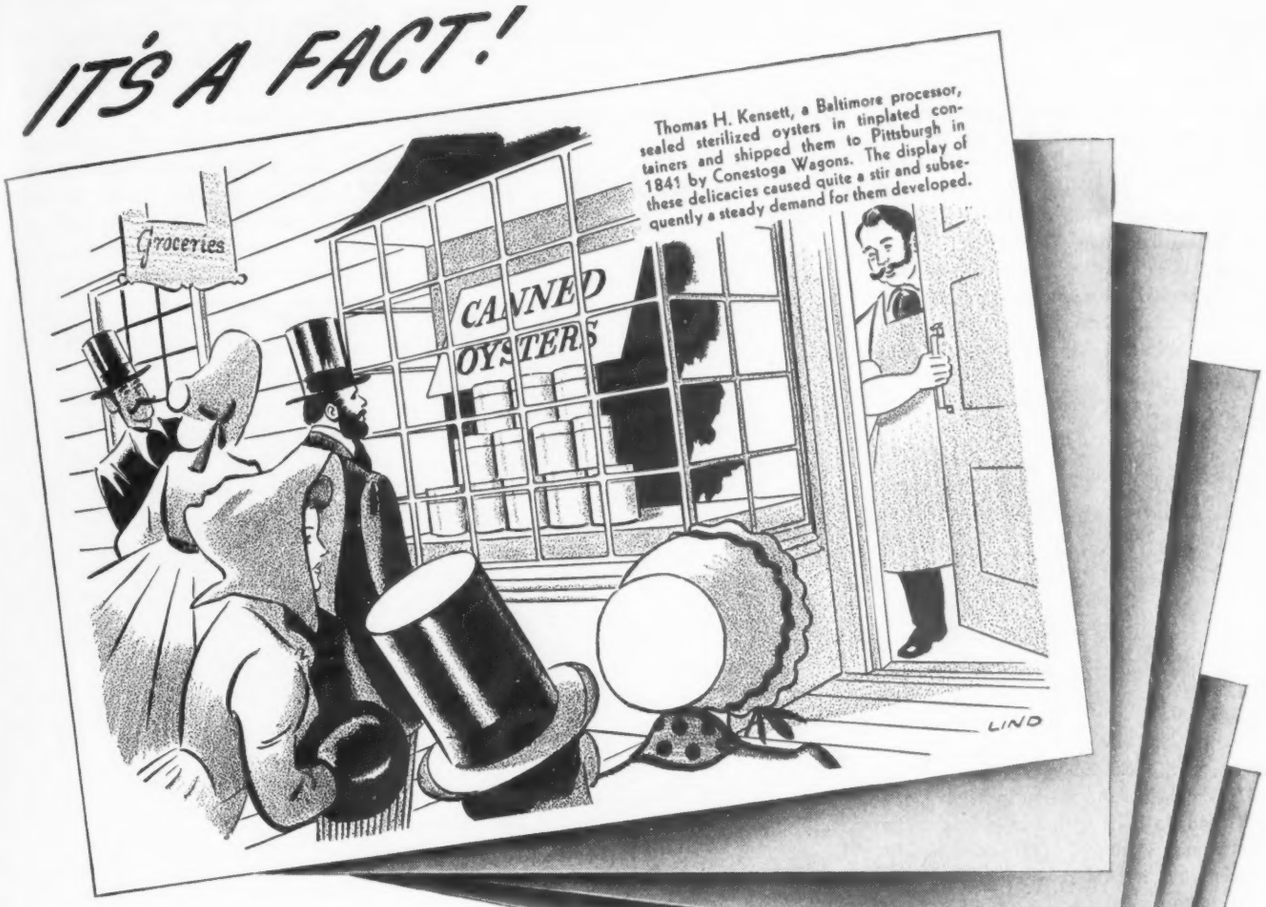
Cleaning Machine

Equipment Division of Magnus Chemical Co. Inc., Garwood, N. J., announces a new small machine for cleaning metal parts in production. It is especially suited for metalworking shops whose volume of parts to be cleaned does not warrant the installation of fully automatic cleaning equipment.

Known as Aja-Dip, Jr., the cleaning

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 138.)

IT'S A FACT!



Thomas H. Kensett, a Baltimore processor, sealed sterilized oysters in tinplated containers and shipped them to Pittsburgh in 1841 by Conestoga Wagons. The display of these delicacies caused quite a stir and subsequently a steady demand for them developed.

It's a better known fact

THAT J&L TIN MILL PRODUCTS HAVE THE QUALITIES THAT GIVE LONG SERVICE

The controlled temper and uniform gage of J&L Tin Mill Products make it possible for them to go through your shaping and forming operations with best results. Their superior surface improves the attractiveness of any product and provides excellent adhesion for lacquers, porcelain enamel and plastic coatings as well as lithographed and painted designs.

J&L Hot Dipped and Electrolytic tin plate and terne plate have the evenly distributed coatings necessary to make soldering operations go smoothly and to provide full protection for the desired service life.

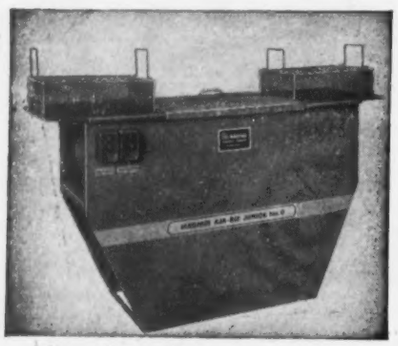
J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PENNSYLVANIA

machine is used for the complete removal of cutting oil and chips, buffing compounds, smut, abrasives or any other deposits resulting from stamping, drawing, cutting, grinding, burnishing or other operations. Parts are handled in batches of 30 to 75 lb depending upon the model of the machine. One full batch of parts can be handled every 2 or 3 min.

Unit cleans by agitation. The parts to be cleaned are vigorously agitated up and down, 72 times a minute, in the cleaning solution. This agitation, plus the



action of the cleaning solution,"shears" dirty deposits from all surfaces of parts.

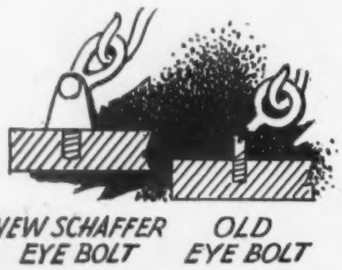
It can be used with any type cleaning compound, alkaline, petroleum spirits, emulsifying agents and chlorinate solvents. It may be used with hot or cold solutions. If heated, heating may be by either electricity or gas.

Unit is available in two sizes, No. 0 and No. 00. Either of the two models can be supplied with built-in rinse compartments which may also have the agitation feature, if desired.

Steel 4/8/46; *Item No.* 9044

Eye Bolt

Load-centering eye bolt offered by S. S. Schaffer & Co., 4211 South Alameda, Los Angeles 11, is said to carry



100 times the load of the ordinary standard eye bolt, because it lifts in line with load.

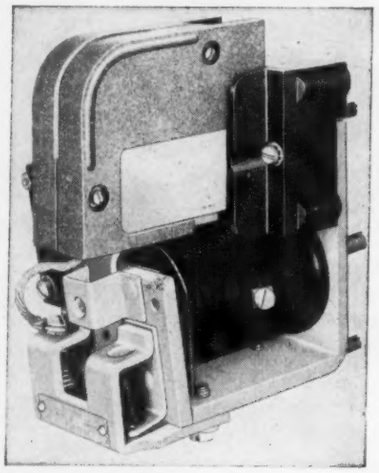
The device is made of steel, whose ductility and toughness make it possible for the eye bolts to be subjected to heavy intermittent strains and jerks. Light in weight and precisely balanced, with replacable bolts it is available in ¼ to 1½-in. sizes, U.S.S. & S.A.E.

Steel 4/8/46; *Item No.* 9097

Magnetic Contactor

Westinghouse Electric Corp., Pittsburgh, 30, announces a new type M direct-current single-pole magnetic contactor for machine tool control and similar severe-duty applications where space is limited.

Small, compact design of contactor saves panel space. It is entirely assembled on a formed frame which also serves as a path for the magnetic flux. The contactor, with a small frame, is limited to



applications in which the coil voltage and the voltage of the circuit being interrupted do not exceed 250 v. But with the deep frame, it will handle voltages up to 600 v.

Operating coils are rated for continuous duty, operating contactors at 80 to 110 per cent of their rated voltage.

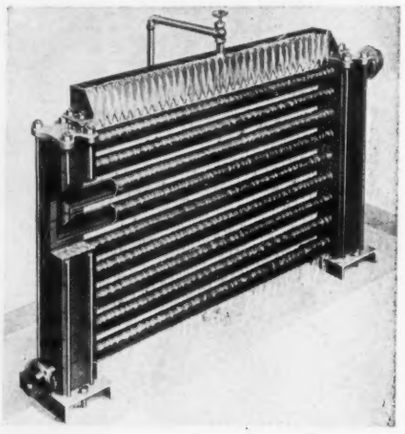
Steel 4/8/46; *Item No.* 9159

Sectional Cascade Cooler

Karbate sectional cascade coolers, designed for efficient cooling of corrosive liquids and gases, are available from National Carbon Co. Inc., New York. A complete cooler assembly is erected from four standard items in five pipe sizes and is adaptable to a wide range of process requirements. Construction is such that additional units, or sections, may be added.

Having the properties of impervious graphite materials such as corrosion resistance, high heat transfer rate, resistance to thermal shock and freedom from corrosion scale formation, these units are recommended for service in practically all acids, caustics and organic solvents at pressures up to 75 psi and temperatures up to 338°F (170°C). Minor changes in method of applying the cooling water permits the handling of gases well in excess of this temperature.

Nine feet long, single pipe, cooler sections are stacked to form a series flow vertical bank and are held in place by steel tie rod assemblies which form a rigid supporting structure. Gaskets are furnished in either synthetic rubber or asbestos composition as required. A standard steel water distributor is mounted on the tie rod

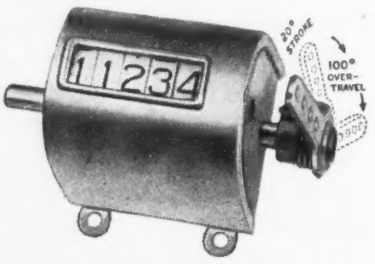


assemblies and can be accurately adjusted to assure uniform cooling water distribution over the pipe. Compact construction offers close pipe spacing and eliminates the necessity of redistribution baffles. Maximum effective external surface areas of approximately 120 ft, are available in all of the five sizes in the maximum recommended cooler height of 6 ft. The complete cooler assembly is easily dismantled for addition or replacement of interchangeable sections.

Steel 4/8/46; *Item No.* 9067

Stroke Counter

A small stroke counter with built-in protection against over travel of operating arm is announced by Production Instru-

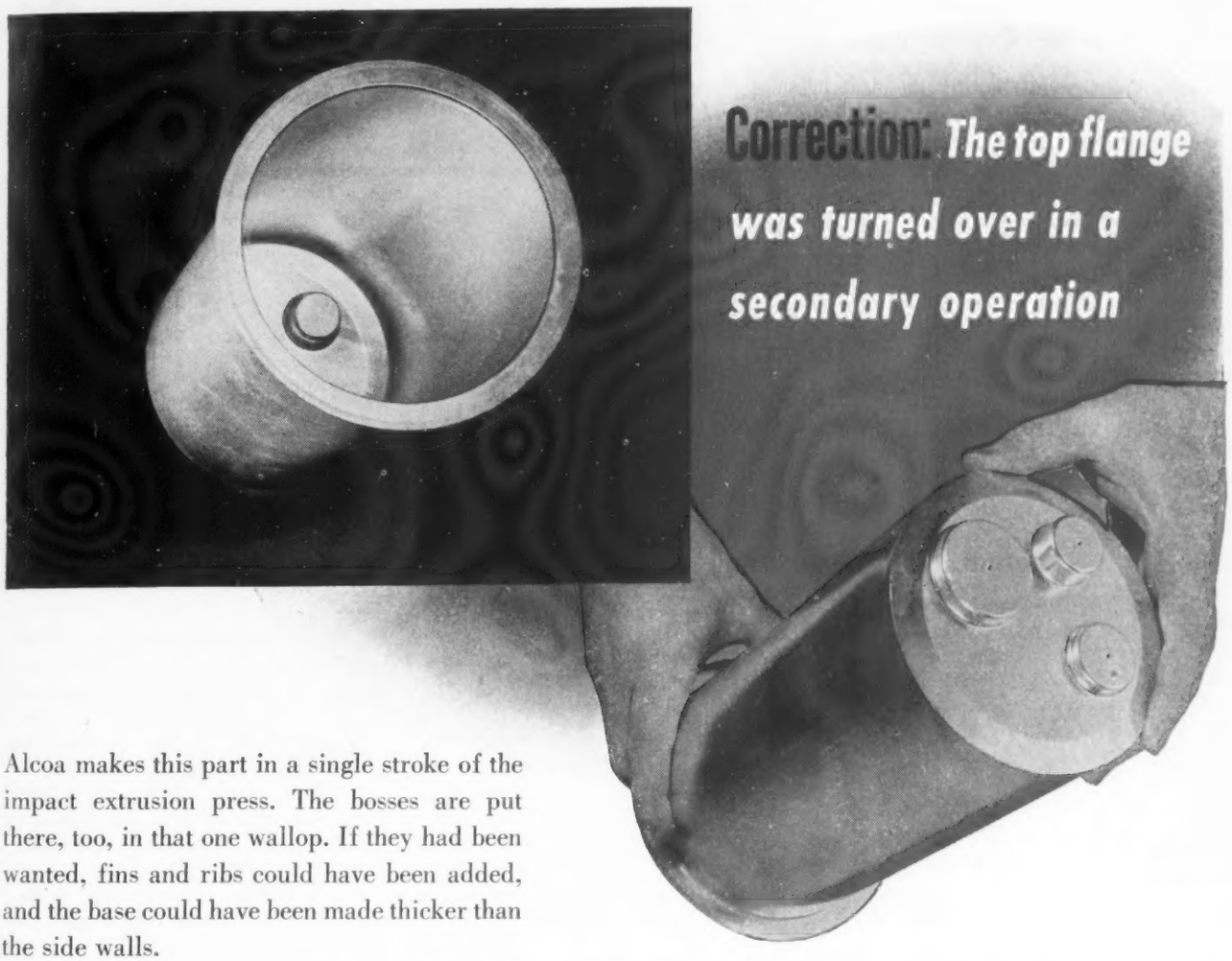


ment Co., 704-16 West Jackson boulevard, Chicago. Equipped with five large number wheels, it registers to 99,999 before repeating.

Operating arm of device works against a coil spring which permits arm to con-

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 138.)

Here's another of Alcoa's "One Wallop" Jobs



Alcoa makes this part in a single stroke of the impact extrusion press. The bosses are put there, too, in that one wallop. If they had been wanted, fins and ribs could have been added, and the base could have been made thicker than the side walls.

Remember how you once figured on three or four drawing operations to make a part like this? Punches, dies, press time, and intermediate heat treatments all ran your costs up *high*. And even then, you'd have to find some way of tacking those bosses on the bottom.

Because Alcoa Aluminum impact extrusions give you so much more to start with, less machine work is required to finish them. Think what this does to your production time and costs! For quotations on impact extrusions, call the nearby Alcoa office, or write

ALUMINUM COMPANY OF AMERICA, 2112 Gulf Building, Pittsburgh 19, Pennsylvania.

ALCOA FIRST IN ALUMINUM

tinue beyond full stroke without injury to counter. Arm may be installed on either side of counter and set at any angle. It is completely enclosed in a tamper-proof case, which, combined with small size, makes it ideal for built-in applications.

Steel 4/8/46; *Item No.* 9131

Miniature Transformer

For use where smallest possible weight and volume are a prime consideration, the new Sub-Ouncer transformer announced by United Transformer Corp., 150 Varick street, New York, is especially suitable for miniature equipment. Measuring only 9/16 x ⅝ x ⅞ in. and weighing only 1/3 oz, it has superior performance and dependability characteristics.

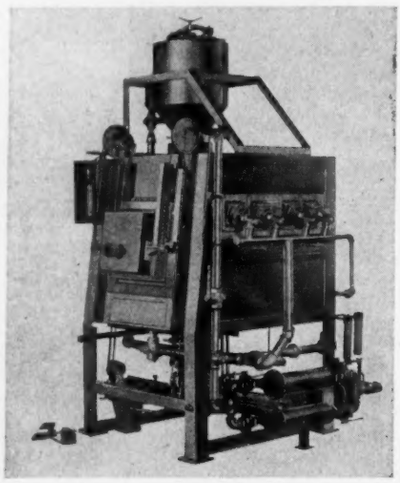
Transformer coil is uniform layer-wound on a molded nylon bobbin. Insulation is cellulose acetate and leads are mechanically anchored externally. Core material is Hipermalloy and entire unit is triple waterproof sealed. Five standard items and special types and mountings are available. Frequency response is plus or minus 3 DB from 200 to 5000 cycles.

Steel 4/8/46; *Item No.* 9226

Dual Purpose Furnace

For increased flexibility in handling different batch type heat treating operations, a new atmosphere muffle furnace is offered by Surface Combustion Corp., Toledo 1. Due to a new feature of design the furnace can produce the proper atmosphere for gas carburizing, yet also is applicable for general heat treating. In addition all the features of Char-Mo heat treating furnaces, including atmosphere and uniform temperature distribution are provided.

After producing the basic atmosphere, furnace utilizes a new gas enriching and recirculating system for gas carburizing. Instead of circulating all the gas in the muffle through the enriching system, thus tending to cool the entire amount, only about 10 per cent is removed from the muffle at any time. This gas is continuously withdrawn near the door, and is first filtered to remove any free carbon which



may have dissociated from the CO in the atmosphere. After filtering the atmosphere gas, the enriching gas (raw material gas or propane) is added through a metering orifice. Gas then passes to the recirculating pump, which is of the positive displacement (vane) type. Gas under pressure is discharged at high velocity into a venturi within the muffle, inspirating into the venturi a large volume of muffle gases. These are mixed in the venturi and are discharged to recirculate throughout the muffle.

For rapid heating the unit is equipped with over-muffle and under-muffle burners. Time to temperature ranges from 2½ to 3 hr. Furnace is available in three sizes, for light or medium batch operations.

Steel 4/8/46; *Item No.* 9032

Ball-Pein Hammers

All metal ball-pein hammers, recently developed by Atlas Welding Accessories Co., 14828 Wyoming avenue, Detroit, are reported to have longer life, and provide greater safety in use.

Unbreakable Flex-o handgrip of the hammers is shaped to fit the hand, absorbs shock of hammer blows. Its safety factor is that it will not fly loose from head.

Heads are of flame-hardened alloy tool steel. These are being made available in several models in a variety of sizes.

Steel 4/8/46; *Item No.* 9197

Electric Lift Truck

Known as the Worksaver, a new electric truck is introduced by Yale & Towne Mfg. Co., Philadelphia. With power for lifting and power for travel, the unit relieves its operator of all physical strain. Compact and easily controlled, it can be maneuvered in congested areas, along narrow passages, and around sharp corners without waste of time or effort. Two forward and two reverse speeds are provided.

Elevating unit on the truck consists of a high-torque electric motor which operates a Yale-designed high-pressure hydraulic gear pump which, in turn, activates a ram. Lifting and lowering is controlled by a switch placed on the front of the battery compartment. Hydraulic ram operates in a honed cylinder and the electric control and valve mechanisms are interlocked, to eliminate overtravel of the lift. When a load is deposited, a special type of hydraulic re-

FOR MORE INFORMATION on the new products and equipment mentioned in this section, fill in this form and return to us. It will receive prompt attention.

Circle numbers below corresponding to those of items in which you are interested:

9129	9067	9055
9112	9131	9063
9113	9226	9325
9044	9032	9040
9097	9197	9327
9159	9015	

4-8-46

NAME ..... TITLE .....

COMPANY .....

PRODUCTS MADE .....

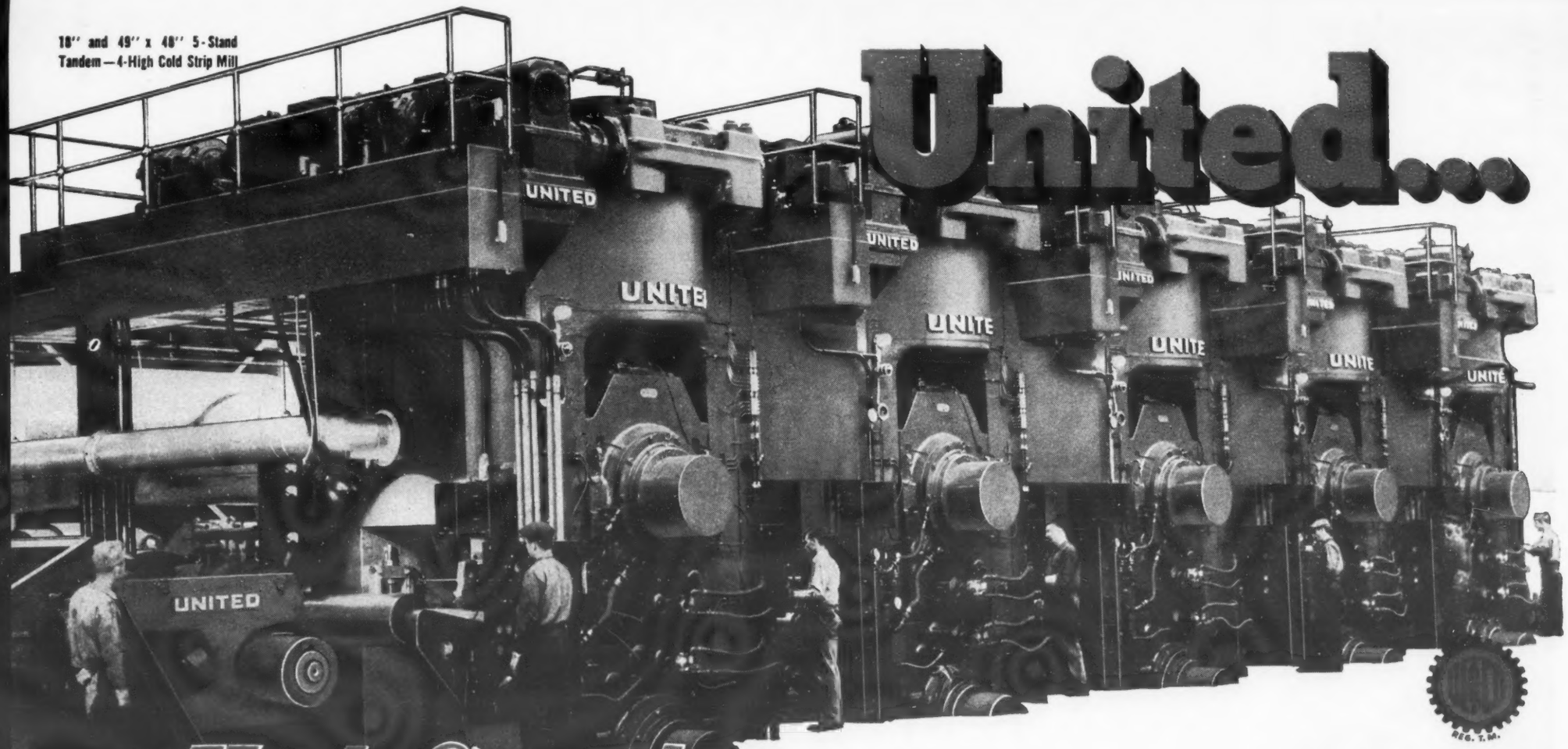
STREET .....

CITY and ZONE ..... STATE .....

Mail to: STEEL, Engineering Dept.—1213 West Third St., Cleveland 13, Ohio

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on this page.)

18" and 49" x 48" 5-Stand
Tandem—4-High Cold Strip Mill



United...

High-Speed 5-stand tandem cold mills

UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at PITTSBURGH · VANDERGRIFT · NEW CASTLE · YOUNGSTOWN · CANTON

Subsidiary: Adamson United Company, Akron, Ohio

Affiliates: Davy and United Engineering Company, Ltd., Sheffield, England

Dominion Engineering Works, Ltd., Montreal, P. Q. Canada

The World's Largest Designers and Makers of Rolls and Rolling Mill Equipment

FOR PRODUCTION OF SHEET AND TINPLATE STOCK

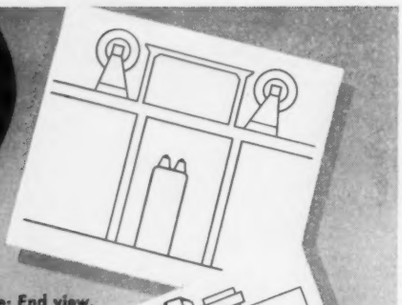
UNITED ENGINEERING and FOUNDRY COMPANY, for 40 years leader in the development of cold reduction processes, offers immediately available designs for high speed, high production, 5-stand tandem tinplate mills with finishing speeds up to 5000 F.P.M. Also available are designs for modern 4-stand and 3-stand units.

These mills embody all the latest features in auxiliary equipment including uncoilers, guides, coolant systems, tension rolls, coilers, etc.

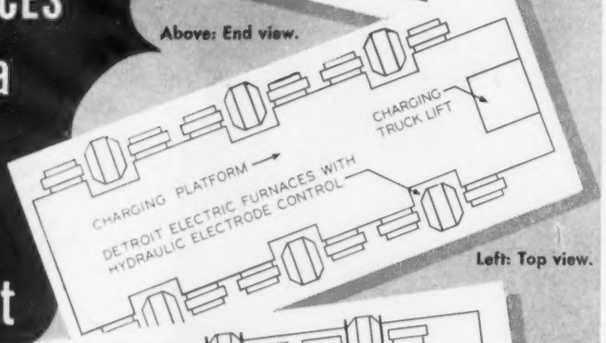
Consult UNITED'S engineers when making plans for reconversion and expansion.

SIX

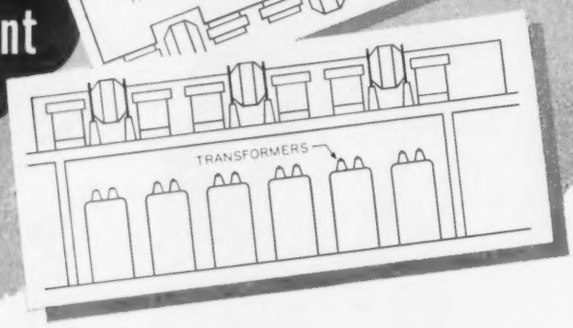
DETROIT ELECTRIC FURNACES complete a modern melting department



Above: End view.



Left: Top view.



Right: Side view.

Four men at the controls of six Type LFY Detroit Rocking Electric Furnaces produce 6000 lbs. of bronze per hour (a 750 lb. heat every 7 minutes) in this compact foundry layout. One man charges the furnaces, two men operate them, and one supervises. The result is maximum utilization of manpower, space and equipment—under most desirable working conditions—for the production of high quality castings. Send us your requirements, and our engineers will determine, without obligation, whether a similar Detroit Electric Furnace layout will provide more economical melting of ferrous or non-ferrous metals in your plant.

Right: Electrodes are controlled hydraulically from stationary pedestals which contain all automatic electrode and rocking controls for regulating melting speed, power input, and other melting factors. Transformers are installed beneath furnaces.

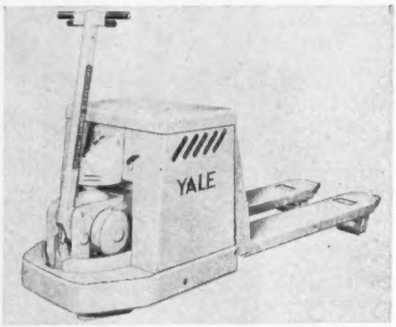
Left: Charging trucks are loaded on the scales in the metal room and elevated to the charging platform which separates two rows of three Detroit Electric Furnaces, installed back to back. Rear charging is accomplished quickly, eliminating congestion in front of furnaces.

DETROIT ELECTRIC FURNACE DIVISION

KUHLMAN ELECTRIC COMPANY • BAY CITY, MICHIGAN

lease check cushions the descent, thus protecting load, floor, and operator.

Drive motor, located at base of steering handle, is a high-torque, ball bearing type. A drive pinion, mounted on its armature shaft, operates through a double-reduction spur-geared unit, running in lubricant, to drive a 10-in. diameter, rubber-tired front wheel. Drive unit is mounted on a 16 in. diameter ball bearing turntable, immediately above the front wheel. Power for both elevating



and drive motors is obtained from a lead or alkaline battery housed in a compartment which is an integral part of the truck chassis.

Unit is available in two types, (1) platform, (2) pallet. The former is designed to handle single unit loads, consisting of a crate, bale, etc., or multi-unit loads on skids or in skid bins up to 6000 lb; the latter to handle single or multi-unit loads which are palletized, up to 4000 lb.

Safety features are found in the mechanism of the Worksaver. When cam controls on the steering handle are at neutral, the brake is "on." When the steering handle is in vertical or horizontal position, brake is automatically applied and the power is cut off. This arrangement not only gives the operator complete control of the truck on ramps, but, in the event the handle is dropped by accident, the truck is halted immediately.

Steel 4/8/46; *Item No.* 9015

Power Conveyer

To meet needs for flexibility in conveying equipment, Island Equipment Corp., 101 Park avenue, New York, is marketing a small powered belt conveyor unit, in 10, 5 and 3 ft lengths.

These units can be coupled together to make as long a conveyor system as may be wanted. They can, due to their short lengths, be twisted around to form any shape; will convey on the level, up or down grade. Two sections will make a 30° turn, three sections 60°, and four sections 90°. Entire assembly or system (from one end to the other)

OZALID does these jobs in seconds!

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Reproduces Engineering Drawings or other translucent originals as any one of ten different types of positive (not negative) Ozalid prints.

Lines and images are reproduced in black, blue, red, or sepia colors . . . on paper, cloth, foil, or film.

You make the type of Ozalid print best suited for the job at hand—in just two steps—Exposure and Dry Development.

2.

Produces Beautiful Advertising Posters and Direct Mail Folders without engravings or make-ready. Your ideas can be in printed form, in the desired number, ready for distribution—the same day they originate.

3.

Matches Typed Material. Ozalid Rapid Black prints do this *so exactly that they are used for form letters*—with personalized headings and references typed in on the print. Recommended for reports, specification sheets, applications, etc.

4.

Copies Continuous-tone Photographic Material without loss of tonal values. OZALID DRYPHOTO prints actually are more vivid, have more sales appeal. What's more, transparent film overlays—in different colors—can be made to show relation of various features of your product.

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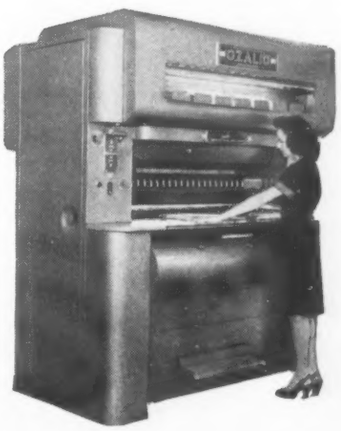
You'll find many additional uses for Ozalid prints on paper, cloth, foil, and film—as all departments will use them to save time, labor, and materials.

OZALID MACHINES are available for all production requirements . . . and can be operated efficiently by anyone.

SEE the 10 types of Ozalid prints and learn the complete story. Write today for free booklet 76.

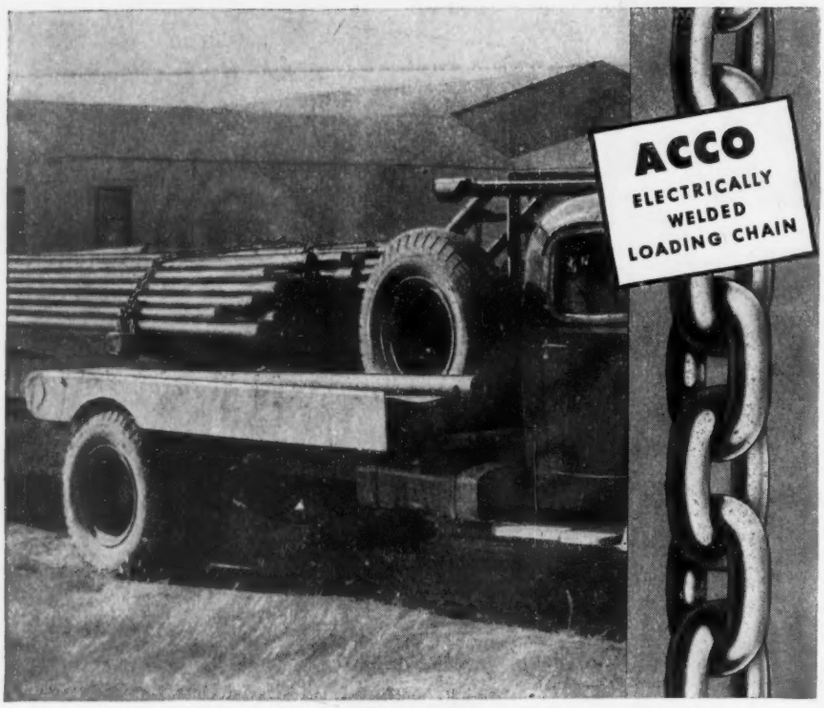


OZALID

DIVISION OF GENERAL ANILINE & FILM CORPORATION
JOHNSON CITY, NEW YORK

Ozalid in Canada—Hughes-Owens Co., Ltd., Montreal

THE TOUGHER THE JOB THE MORE REASON TO "BUY AMERICAN"



Notwithstanding the current great demand for American loading chains, sling chains, coil chains, conveyor chains, logging chains, railroad chains, machine chains — in fact, all types of welded and weldless chains — we will take no short cuts in manufacturing, inspection, or testing ... We will not compromise with American Chain quality, for that is something which our customers have depended on for many, many years, and we want them to continue depending on it for many years to come. Any chain made by American Chain must be safe, must be dependable ... We are making all we can, as fast as we can, under these principles.

ACCO

York, Pa., Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.

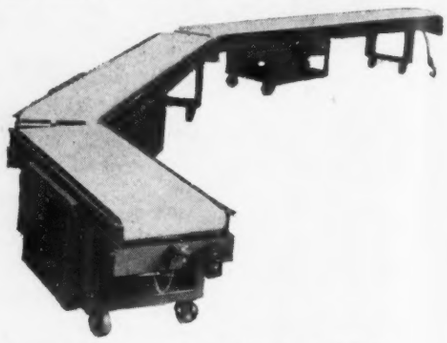
AMERICAN CHAIN DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

can be instantaneously controlled from the unloading end, by positive push-button control. Speed of all units is coordinated or synchronized as though it were one unit.

Belts of these units come in three different widths, 12, 16 and 20 in. They are driven by the company's Power-Pac motorized power unit. Each unit is equipped with ample ball bearing swivel casters that permits them to be quickly and easily moved. Units are each capable



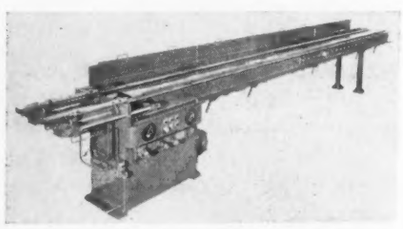
of carrying a distributed load of 400 lb.

Space that naturally forms where two fixed parallel ends meet when these are turned at different angles, is taken care of by a patented set of differential rolls that can quickly and easily be dropped in place between the two units. As the conveyed material passes over these rolls, it is guided into the next conveyor and so on to the end of the system. No guides are required, at any point, to keep material being conveyed from jumping or running off the belt.

Steel 4/8/46; *Item No.* 9055

Tensile Strength Tester

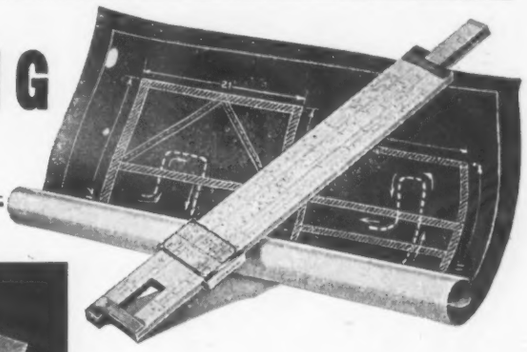
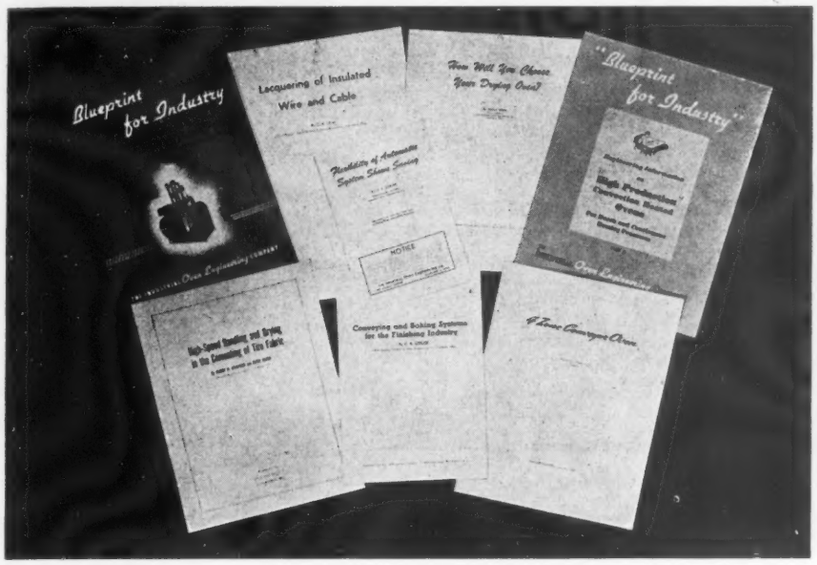
A new tensile strength tester developed by John S. Barnes Corp, Rockford, Ill., is easily adapted to testing the tensile strength or modulus of elasticity of a wide variety of metal products, such



as chains, wires, cables, bar stock, etc. This machine may also be used to give a definite set to chains. With this new piece of equipment, an inexperienced operator is able to make tests that are quick, safe, and yet highly accurate without resorting to laboratory methods.

The device is 25 ft long, and can accommodate chains and cables of any length up to 20 ft. Easily adjusted platforms are provided to eliminate sag,

OVEN ENGINEERING NEWS



Blueprint for Industry
Lacquering of Insulated Wire and Cable
How Will You Choose Your Drying Oven?
"Blueprint for Industry"
NOTES
Conveying and Baking Systems for the Finishing Industry

Write for These Technical Bulletins on Oven Engineering Installations

The battle of costs is a battle that never ends. Present day problems dictate the policy of constantly surveying your existing facilities for materials-handling as well as your oven-processing systems, in order to keep your manufacturing costs at a profitable level.

The Industrial Oven Engineering Company designs, engineers, manufactures and installs complete materials-handling and oven-processing systems for many different industries.

These installations are described in the pamphlets listed below. They are well illustrated with photographs and drawings. A good many of these installations are probably applicable with slight variation, to your own processing problems.

These pamphlets are free. They are briefly described below. Check off the ones you want and drop us a line.

☐ **Blueprint for Industry, Part III**—Complete engineering information on our constant-speed, constant-tension windup machine for wire, cable, textile, tape, coated fabrics and other continuous materials, the only machine of its kind on the market.

☐ **Lacquering of Insulated Wire and Cable**—A 16-page reprint of a thorough-going article on cable lacquering techniques and equipment, originally published in the trade magazine "Wire and Wire Products". Illustrated with drawings.

☐ **How Will You Choose Your Drying Oven?**—A description of the role of the infra-red lamp in modern drying ovens.

☐ **Blueprint for Industry, Part II**—A comprehensive 18-page brochure on high-production ovens for many batch and continuous heating processes. In addition to detailed descriptions and engineering details of many efficient oven-materials-handling systems, it contains two pages of engineering data on gases and other materials, along with fan engineering data.

☐ **High-Speed Handling and Drying in the Cementing of Tire Fabric**—A description of a continuous, safe method of fabric cementing in which high-calendering speeds were obtained by the designing of equipment which would fit into limited manufacturing space.

☐ **Flexibility of Automatic Systems Shows Saving**—A description of a 3-zone automatic conveyer oven installation which increased production speed, reduced the number of necessary attendants without loss of floor area.

☐ **Conveying & Baking Systems for the Finishing Industry**—A thorough discussion of the different types of conveyer and baking systems with an analysis of their respective advantages.

☐ **Four-Zone Conveyor Oven**—This reprint describes a four-zone conveyor oven through which products are conveyed successively through ventilation, preheating, baking and cooling zones at production speeds and free from all dust.

Get This Unusual Story of Wire Lacquering

We have in our last four advertisements described several different cable lacquering systems that we have engineered and installed. For those interested in securing a more complete picture of the basic IOE cable lacquering systems there is available, *Lacquering of Insulated Wire and Cable*, a 16-page reprint of a thorough-going article on cable lacquering technique and equipment, originally published in WIRE AND WIRE PRODUCTS. Our work on cable lacquering systems in particular, represents *new basic thinking* on an old problem, that has a wide number of new applications. Perhaps some of your own problems would benefit by the application of our engineering experience.

(This is No. 25 of a series. Reprints of previous advertisements sent free upon request.)

IOE ENGINEERING VERSATILITY

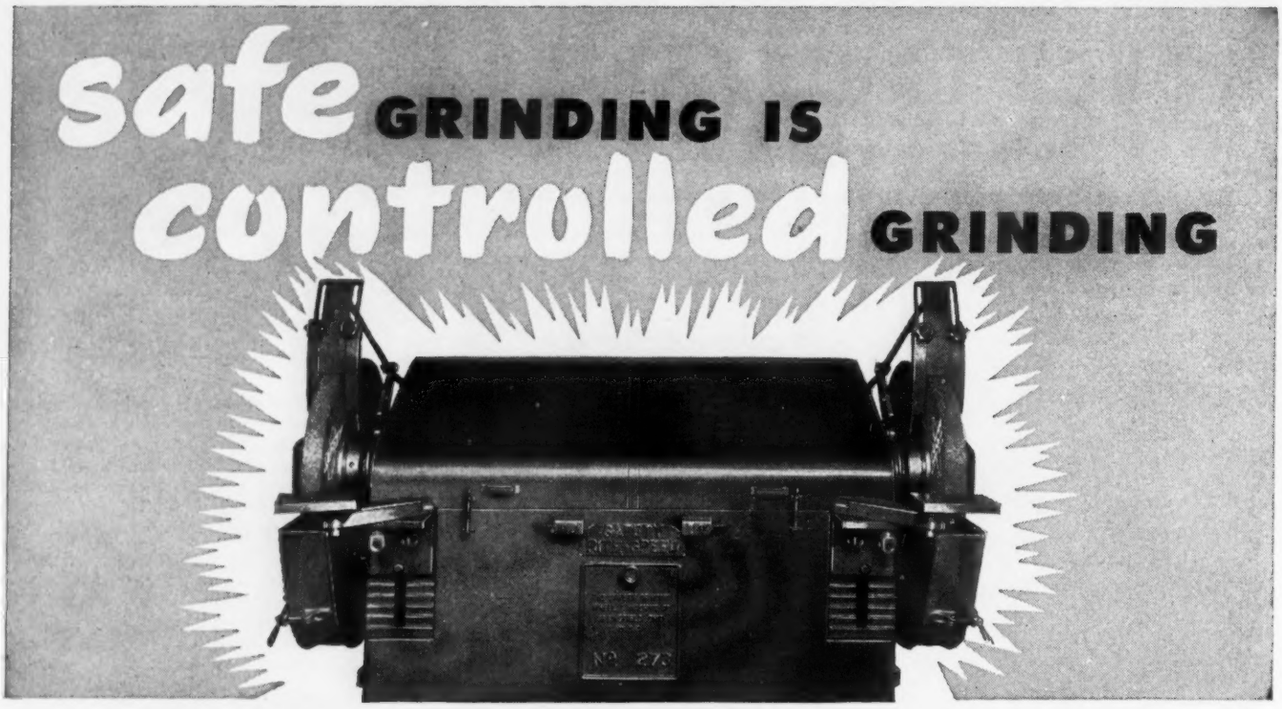
THE INDUSTRIAL *Oven Engineering* COMPANY

13825 TRISKETT ROAD, CLEVELAND 11, OHIO

Engineering Representatives in Principal Industrial Areas

★ ASSOCIATED COMPANY: JAMES DAY MACHINERY LTD., LONDON, W. 1, ENGLAND ★

safe GRINDING IS controlled GRINDING



. . . absolute control is available now in

SAFETY "RITE-SPEED" GRINDERS

with dual control systems

. . . CHANGEABLE SPEED . . . SAFETY INTERLOCK

Your assurance of the very best results in grinding work is constant control of peripheral speed. It is *the* factor of utmost importance. SAFETY research engineers proved it . . . then developed the distinctive SAFETY "Rite-Speed" principle which provides for *correct initial speed* and the *maintenance* of *continual* correct speeds during the course of the job and the life of the grinding wheel. In SAFETY "Rite-Speed" GRINDERS, the rotative speed of the grinding wheel is increased as the wheel becomes smaller to maintain optimum peripheral speed continuously by—

"CHANGEABLE SPEED" or "INTERLOCK SYSTEMS"

In the "Interlock" method, the machine automatically stops when the grinding wheel has been reduced to a predetermined diameter. It is then instantly adjusted and grinding resumed.

In the "Changeable Speed" system, the correct surface speed is re-established by increasing the r.p.m. of the spindle. Motor pulleys in various sizes furnished with "Rite-Speed" GRINDERS, can be changed in but a very few minutes, with minimum effort.

SAFETY "Rite-Speed" double wheel, stationary GRINDERS, Swing Grinders and Grinding Wheels, tailor-made for every purpose, can help solve your grinding problems for more profitable operation by speeding up production, lowering costs! For further information on these products, their application to your business and more about this reliable, over-half-a-century old company, wire, phone or write our factory, or any of our offices listed, for prompt action. Do it *today!* Ask for descriptive booklets.

Safety

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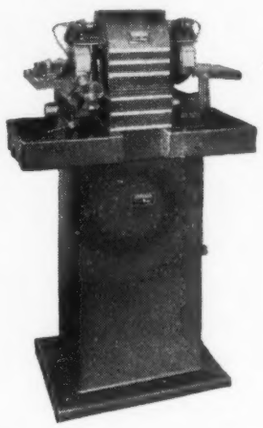
thereby insuring maximum accuracy in testing. Two 4 in. bore by 8 in. stroke low friction cylinders provide initial test loads up to 1500 lb. Final test loads may be as great as 15 tons.

A timing device automatically removes the test load. Elongation of the metal under test is registered automatically on verniers on the front of the machine in convenient reading position. Verniers may be reset to zero at any time during the test, thus permitting comparative readings, for any portions of the test cycle. Verniers retain their maximum readings until they are reset.

Steel 4/8/46; *Item No.* 9063

Tool Grinder

A new grinder for carbide-tipped tools and other tool bits requiring keen edges and extreme accuracy is announced by Willey's Carbide Tool Co., 1340 West Vernor Highway, Detroit. Rough, semi-



finish and finish grinding of bits up to 2 in. square is possible with this machine.

Operated by a 1/3 hp, 3450 rpm, reversible type motor, this grinder designated as 50-A, has a 12 x 6 in. tool rest table, with keyway provided for protractor, tool guide and dresser. A direct drive pump circulates coolant.

Steel 4/8/46; *Item No.* 9325

Drill Press Feed

A new, "stepless-range" power feed for use on drill presses, milling machines, surface grinders, etc., is introduced by Bellows Co., 861 East Tallmadge avenue, Akron 10, O.

At a touch of the handle, feeds advance work or tools a predetermined distance, under a predetermined power thrust, and automatically return to starting position. Precision controls for feed and traverse rate, for power thrust, and length of stroke are simple and positive.

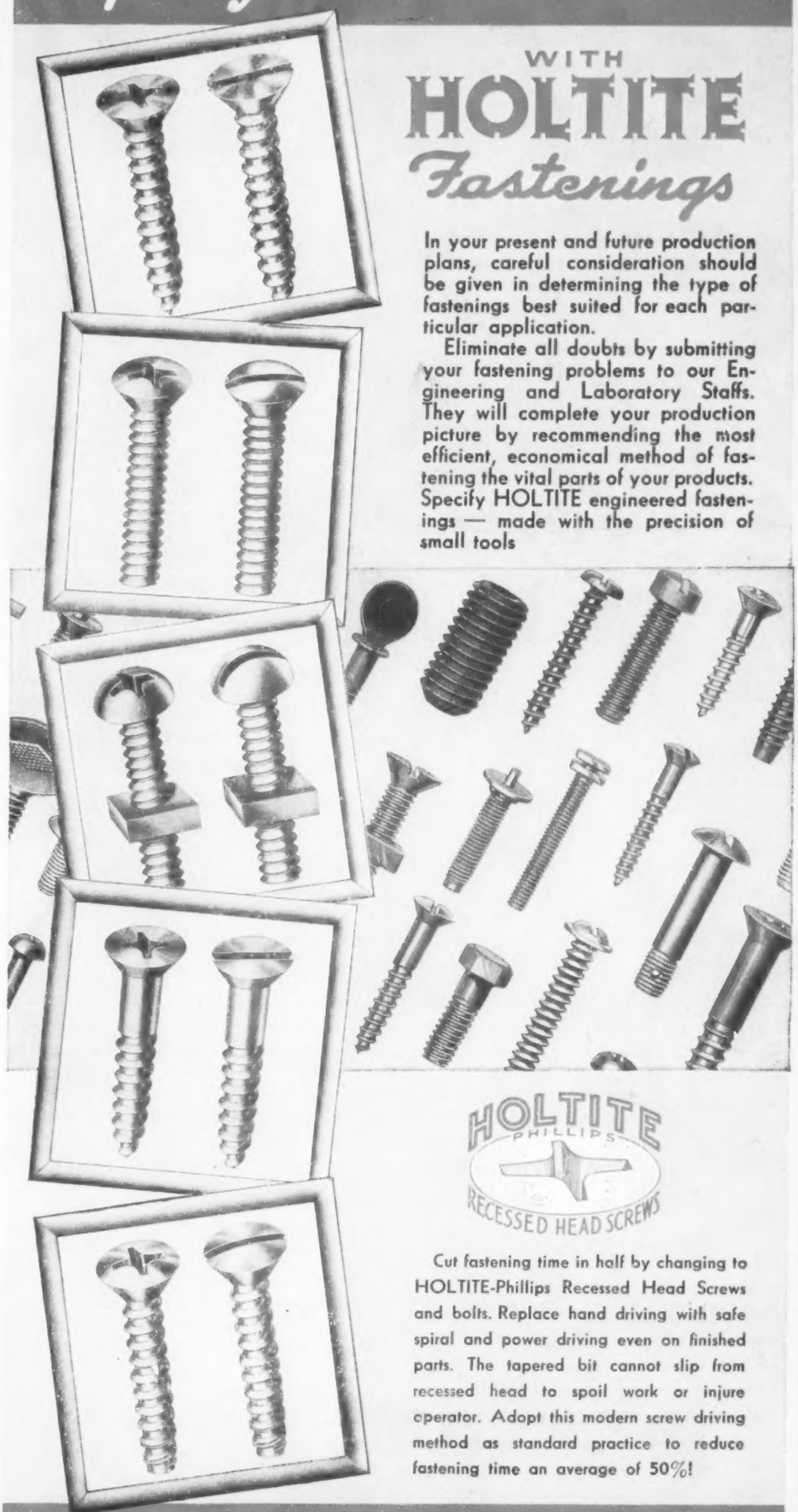
It is powered by the company's air motor, and operates on any air pressure up

Complete Your Production Picture

WITH HOLTITE Fastenings

In your present and future production plans, careful consideration should be given in determining the type of fastenings best suited for each particular application.

Eliminate all doubts by submitting your fastening problems to our Engineering and Laboratory Staffs. They will complete your production picture by recommending the most efficient, economical method of fastening the vital parts of your products. Specify HOLTITE engineered fastenings — made with the precision of small tools



HOLTITE PHILLIPS RECESSED HEAD SCREWS

Cut fastening time in half by changing to HOLTITE-Phillips Recessed Head Screws and bolts. Replace hand driving with safe spiral and power driving even on finished parts. The tapered bit cannot slip from recessed head to spoil work or injure operator. Adopt this modern screw driving method as standard practice to reduce fastening time an average of 50%!

CONTINENTAL SCREW CO.

New Bedford, Massachusetts, U.S.A.

BAKER

ARMY (E) NAVY

QUICK CHANGE ARTIST

BAKER, 314-A. Universal quick change type heavy duty drill, arranged with multiple head and work holding fixture. This machine is furnished with BAKER flange quill spindle construction for more rigid and better applications of the multiple head to the machine.

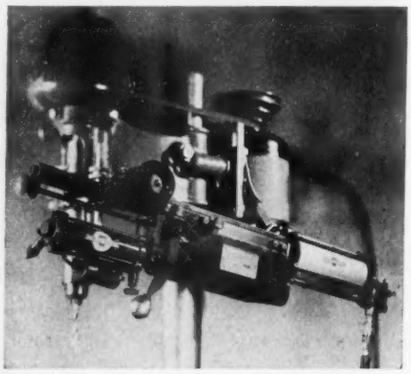
Being a typical BAKER quick change artist, this machine can be readily changed to a single spindle type by the furnishing of a new spindle assembly. This results in a flexible, fuller, universal single spindle, heavy duty drill with six instantaneous changes of speed and quick change of feed. All controls are convenient to the operator in his normal position. Reversing type controller is also furnished which allows for handling tapping operations. ALL BAKER, geared feed heavy duty drills can be furnished with positive thread lead attachment, giving positive lead to taps. Greater life of taps and more accurate tapped holes are thus assured.

BAKER BROTHERS, INC. will gladly furnish any further information you may desire. Write now for our folder containing descriptions and specifications.

BAKER BROTHERS *Incorporated*

TOLEDO, OHIO, U. S. A.

to 160 lb, delivering a power thrust approximately five times operating air line pressure. Feeding rate can be adjusted to fit perfectly the needs of stock or tool. Simple adjustment of the two throttle valves permits unlimited variation of feed and retraction speed in a stepless range. Advance may be so slow it is barely discernable, the return as fast as desired. Feeds are made in two sizes: Model DF-60, using a 6 in. stroke air motor, which

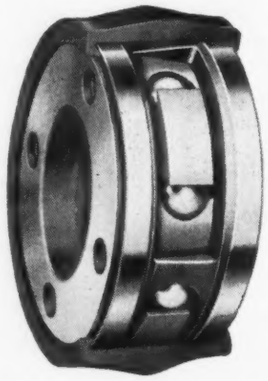


gives up to one revolution of the pinion shaft, and Model DF-90, using a 9 in. stroke air motor, which will give up to one and one-half revolutions of the pinion shaft. Standard equipment includes air pressure regulator, gauge, oiler, filter, hose, fittings and quick coupler.

Steel 4/8/46; *Item No.* 9040

Flexible Coupling

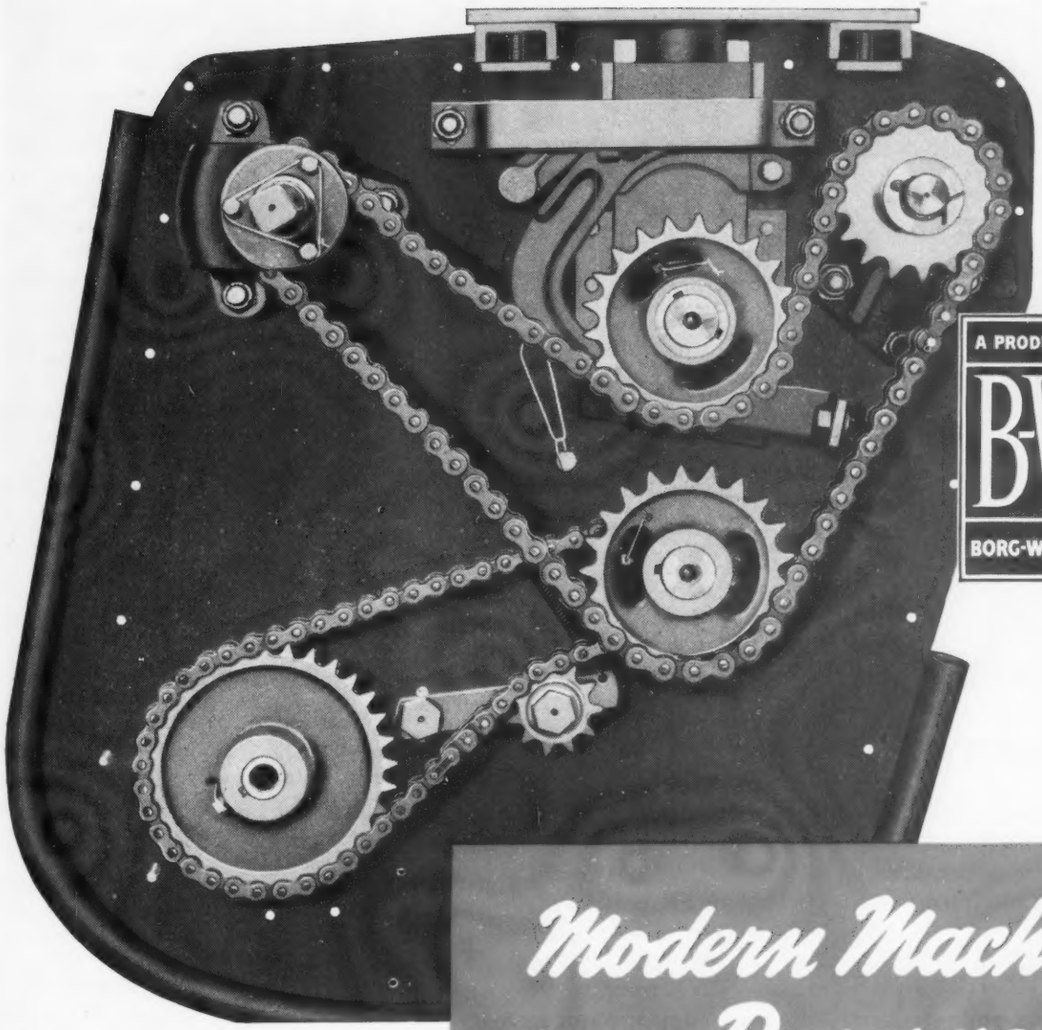
Ballflex, a new angular and axial flexible coupling, is offered by Gear Grinding Machine Co., 3901 Christopher, Detroit. Obtaining its flexibility by mechanical means, it utilizes steel balls to lower fric-



tion and transmits torque. Free rolling movement in any direction eliminates side thrust or springing of parts.

The coupling is lubricated for life, being sealed with an oil-impervious synthetic. Simple installation consists inserting coupling between flanges on two shafts and bolting. Parallel misalignment up to ⅛-in. and angularity up to 3° are accommodated.

Steel 4/8/46; *Item No.* 9327



A PRODUCT OF B-W BORG-WARNER

Modern Machines Deserve Morse Drives...

Modern design makes it possible to "make hay in a day" with John Bean Mfg. Company's "Haymaker." Morse Nos. 50 and 60 Roller Chains in the drive assembly, using teeth not tension, mean positive, efficient, trouble-free operation. MORSE CHAIN COMPANY, ITHACA, N. Y., DETROIT 8, MICHIGAN.

MORSE ROLLER and SILENT CHAINS

SPROCKETS • FLEXIBLE COUPLINGS • CLUTCHES

Cargo – Served Up Air Line Style!

To TWA—long one of the world's leading air lines—a single minute can mean five miles travelled in the air, or five miles lost on the ground. More than a year ago, Trans World Airline set out to shorten cargo handling time at terminals to keep pace with faster flight schedules made possible by improved aircraft.

After making a thorough study of its existing handling methods and investigating the methods and equipment used by other air lines, as well as by the Army and Navy during the war, TWA selected Towmotor Lift Trucks and Industrial Tractors, basing its choice on Towmotor's performance in handling all types of air cargo.

An unusual application of the lift truck system was worked out by TWA, whereby special 4-wheeled cargo trailers are moved in trains to plane side by Towmotor Tractors, at which point a Towmotor Lift Truck raises each trailer to plane loading level. This arrangement not only speeds up loading and unloading, but the trailer itself provides extra working space for cargo handlers, simplifying movement of cargo in and out of the plane and expediting balanced loading, particularly important in air transport.

The use of 4-wheeled trailers with Towmotor Tractors also enables TWA to collect various types of cargo, such as baggage, air mail and air express, at separate points in the terminal and move it rapidly and safely to plane side for loading. Similarly, unloaded cargo is distributed quickly and carefully to various locations at the airport.

For every handling problem there is an engineered solution . . . a solution based upon Towmotor experience and know-how gained in solving handling problems in every industry. Send for your copy of the Towmotor Lift Truck ANALYSIS GUIDE today. Towmotor Corporation, 1223 East 152nd Street, Cleveland 10, Ohio.

TAKE IT UP WITH

TOWMOTOR

THE ONE-MAN-GANG

Labor Saving Devices

(*Concluded from Page* 124)

cars on the pit side to the furnace floor and roof.

Pits have been kept clean by using a back hoe type shovel on the pit side of the furnace. This arrangement also has speeded up the disposal of refuse from producer gas furnaces. This unit is desirable because of the low working height of the boom. Rapid disposal of refuse by trucks has necessitated the placing of concrete floors throughout the open-hearth shops. This has been a desirable change inasmuch as it improves the safety and good housekeeping which is necessary in the prevention of accidents. The Sergeant overhead shovel had been effective in one of our shops in loading open-hearth refuse directly into cars in the pit.

With slow deliveries and shortage of railroad cars, it has been necessary to find some means to reduce the high loading and unloading costs of scrap as received in the plant. The use of a mobile diesel shovel with an attached power generator for magnet operation has helped reduce the cost of handling scrap. Of course, this saving is only possible when you are unable to schedule daily scrap in sufficient quantities to maintain your schedule for the open-hearth shop but, if the expense must be absorbed, it certainly should be as small as possible.

Scheduling and saving of all labor department equipment as outlined, should be the responsibility of the labor department itself and sufficient facilities should be placed at its disposal to properly do the job. Lack of definite responsibility has indicated high maintenance cost and low availability of equipment. Experience has shown that if the men who are to operate new equipment are consulted as to their needs and what the equipment must do, they have a better attitude and will do everything in their power to make it do the job after it is purchased.

Foregoing paper was presented before the Chicago section, National Open Hearth Steel Committee, American Institute of Mining and Metallurgical Engineers, Del Prado Hotel, Chicago, March 11.

Sintered Alnico II Facilities Expanded

Facilities for engineering and producing sintered Alnico II in a wide variety of small magnet sizes and odd shapes have been announced by the Stackpole Carbon Co., St. Marys, Pa. Licensed under General Electric patents, the material is said to offer magnetic properties equivalent to those of cast product. It has advantages in uniformity characteristics.

"The Best Lathe Ever Made!"

ST. LOUIS
AUSTRALIA
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Says User from "Down Under," about his 22" HYDRATROL LATHE
LEHMANN MACHINE COMPANY ST. LOUIS, U.S.A.
LEHMANN MACHINE COMPANY ST. LOUIS U.S.A.

Heavy Duty Lathes
20" to 36"

THIS Melbourne concern, which has had a 22" Heavy Duty HYDRATROL LATHE in constant use for the past 2 years, recently wrote us:

"We have had lathes from all nations in use these twenty-five years, but your lathe is certainly something to be proud about.

"We have found that the design is really marvelous, and has been carried out to perfection.

"I, and all my business friends that have seen this Hydratrol Lathe working, agree that it is the best engine lathe ever manufactured, and you have every reason to be proud of your product."

Let us show you what a Heavy Duty HYDRATROL LATHE could do in *your* shop.

LEHMANN MACHINE COMPANY, ST. LOUIS 3, MISSOURI

HYDRATROL LATHES
(HEAVY DUTY TYPE)

the BUSINESS TREND

ALL LIKELIHOOD that the high level of industrial production prevailing the last several weeks would be sustained has been erased by the strike of bituminous coal miners. When industrial production figures for the week ended Apr. 6 become available they undoubtedly will show a decline resulting from the coal strike.

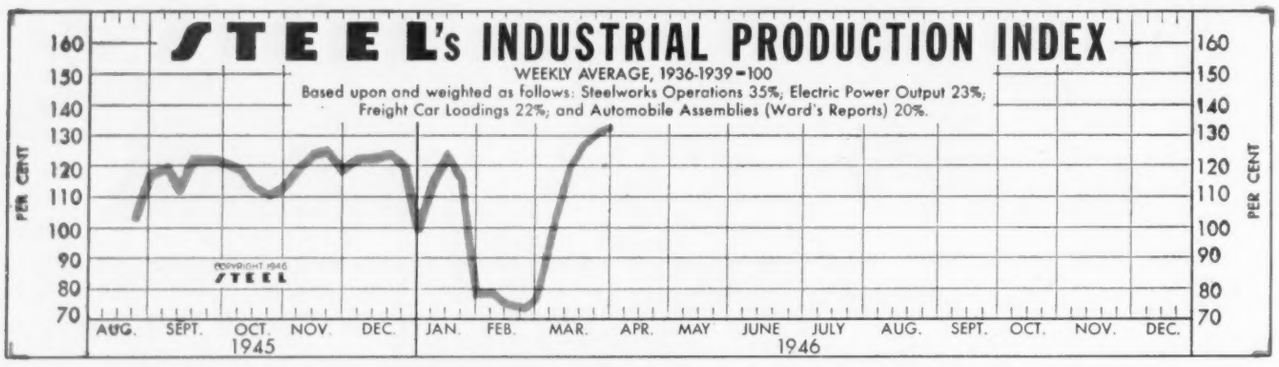
After settlement in February of the steel strike, STEEL's industrial production index rose continuously with the result that in the week ended Mar. 30 the index was at a new postwar peak of 132 per cent (preliminary) of the 1936-1939 average. Had the coal strike not interfered, industrial production almost certainly would have continued its uptrend, because the huge demand for steel would have pushed steelmaking at least a bit higher and automobile production, which has been rising but which is at less than half of capacity, would have been an increasingly buoyant influence.

AUTOS—A prolonged coal strike would curtail steel supplies and electric power, and thereby hold back automobile production. In the week ended Mar. 30, production of passenger cars, trucks and buses in the United States and Canada was 43,070 units, an increase of 5785 over the previous week, and highest since January, 1942. All of this output, except 250 cars, was attained without production by General Motors Corp. plants. Auto production in the week ended Apr. 6 is estimated at 50,000.

COAL PRODUCTION—Through Mar. 23, bituminous coal production in 1946 totaled 4.4 per cent, or 6,221,000 tons, more than in the corresponding period of 1945. Only half a week of no production erases that gain, for weekly output in the past several weeks has been running slightly more than 13 million tons.

CAR LOADINGS—The Association of American Railroads estimates freight car loadings for the second quarter of 1946 will be 4.2 per cent below those in the corresponding period of 1945. However, a prolonged strike of bituminous coal miners likely would make the decrease more than 4.2 per cent, for the association had estimated that coal and coke loadings would be 2,438,100 cars, compared with 2,425,492 cars in the second quarter of 1945. Coal and coke loadings are an important influence on trends in total car loadings, for a third of all loadings consist of coal and coke.

CASTINGS—Shipments of gray iron castings, including soil and pressure pipe, during January totaled 638,616 tons, a 4 per cent increase over December, 1945, but 19 per cent under January, 1945, when wartime activity in the iron castings industry was near its peak. Unfilled orders for castings for sale to the trade on Jan. 31 totaled 1,858,775 tons, an 11 per cent increase over the backlog at the end of December, 1945, and only 2 per cent under the wartime peak of 1,904,419 tons on March 31, 1945.



The Index (see chart above): Latest Week (preliminary) 132 Previous Week 131 Month Ago 105

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	89.5	88.5	56	97
Electric Power Distributed (million kilowatt hours)	3,992	4,017	4,000	4,329
Bituminous Coal Production (daily av.—1000 tons)	2,195	2,197	2,100	1,969
Petroleum Production (daily av.—1000 bbls.)	4,424	4,431	4,726	4,781
Construction Volume (ENR—Unit $1,000,000)	$134.9	$105.9	$96.8	$37.3
Automobile and Truck Output (Ward's—number units)	43,070	37,285	17,575	20,335

*Dates on request.

TRADE				
Freight Carloadings (unit—1000 cars)	804†	805	782	835
Business Failures (Dun & Bradstreet, number)	18	22	15	28
Money in Circulation (in millions of dollars)‡	$27,842	$27,889	$27,938	$25,834
Department Store Sales (change from like wk. a yr. ago)‡	+12%	+13%	+20%	+25%

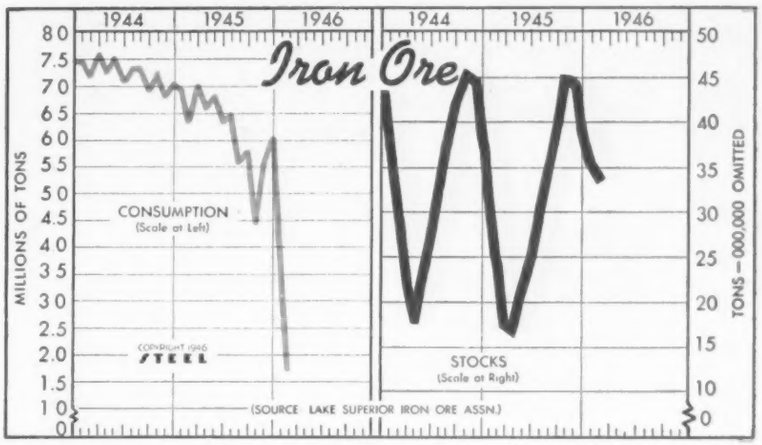
†Preliminary. ‡Federal Reserve Board

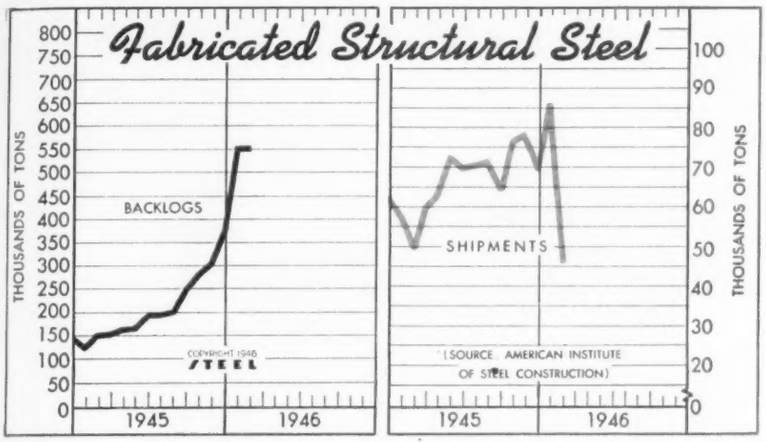
Iron Ore

(Lake Superior Iron Ore Assn.)

Gross Tons—000 omitted

	Consumption		Stocks at Lake Erie docks and furnaces	
	1946	1945	1946	1945
Jan.	3,719	6,983	35,342	30,889
Feb.	1,748	6,371	33,647	24,577
Mar.	....	7,082	.....	17,304
Apr.	....	6,642	.....	16,429
May	....	6,872	.....	20,715
June	....	6,397	.....	24,847
July	....	6,532	.....	29,485
Aug.	....	5,658	.....	34,781
Sept.	....	5,837	.....	39,549
Oct.	....	4,491	.....	45,090
Nov.	....	5,611	.....	44,706
Dec.	....	6,099	.....	39,059
Total	....	74,576	.....	.....





Fabricated Structural Steel

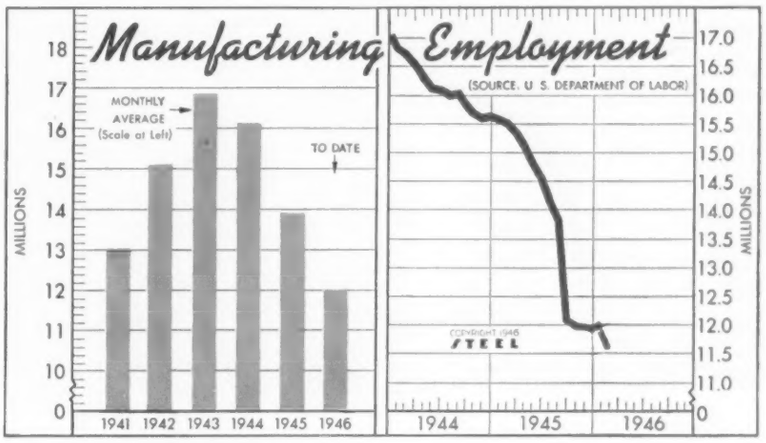
(1000 tons)

	Shipments			Backlogs		
	1946	1945	1944	1946	1945	1944
Jan.	86.4	57.0	35.2	552	124.4	113.1
Feb.	45.8	49.0	42.9	551	151.6	117.6
Mar.	...	59.5	41.4	...	153.3	106.3
Apr.	...	62.8	44.5	...	162.5	111.2
May	...	72.6	50.7	...	165.7	116.3
June	...	69.2	43.0	...	195.2	122.7
July	...	69.9	45.3	...	194.0	125.4
Aug.	...	70.6	55.2	...	201.1	130.4
Sept.	...	63.4	57.5	...	248.5	151.1
Oct.	...	76.6	61.6	...	282.8	174.4
Nov.	...	78.0	59.4	...	304.9	184.2
Dec.	...	68.8	61.3	...	375.2	142.5
Total	...	797.4	597.9	...	....	....

Factory Employment

(000 omitted)

	1946	1945	1944
January	12,048	15,555	16,825
February	11,614	15,517	16,735
March	.....	15,368	16,559
April	.....	15,102	16,309
May	.....	14,811	16,122
June	.....	14,538	16,093
July	.....	14,130	16,013
August	.....	13,831	16,023
September	.....	12,097	15,843
October	.....	11,941	15,692
November	.....	11,947	15,607
December	.....	11,914	15,632
Monthly Ave.	.....	13,896	16,121



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$11,788	$13,069	$9,838	$10,748
Federal Gross Debt (billions)	$276.8	$276.7	$279.7	$234.7
Bond Volume, NYSE (millions)	$25.7	$24.0	$32.2	$30.3
Stocks Sales, NYSE (thousands)	6,804	6,370	8,948	4,197
Loans and Investments (billions)†	$66.3	$67.7	$68.2	$58.1
United States Gov't. Obligations Held (millions)†	$47,458	$49,088	$49,586	$43,774

†Member banks, Federal Reserve System.

PRICES

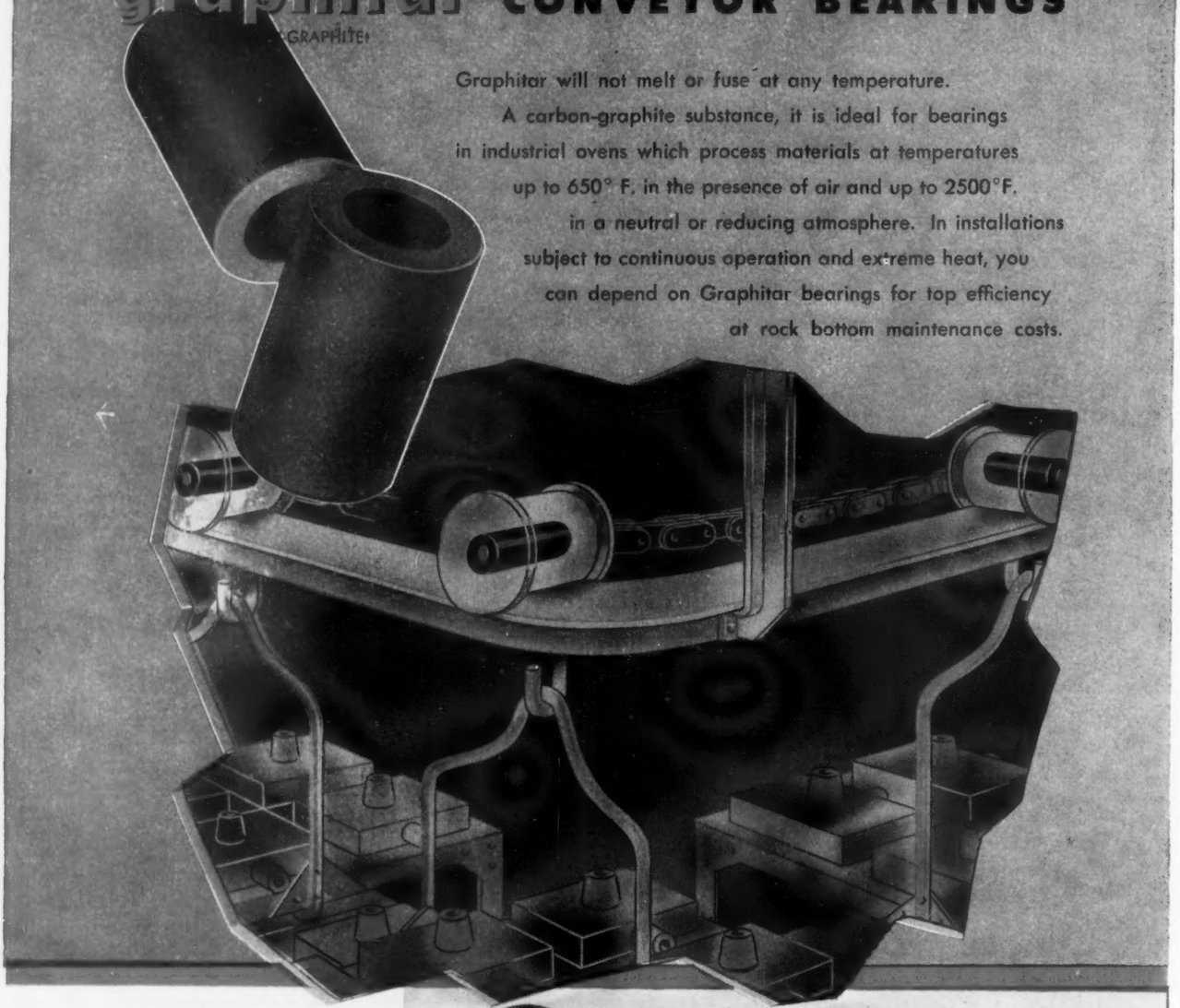
STEEL's composite finished steel price average	$63.54	$63.54	$63.54	$57.55
All Commodities†	108.4	108.4	107.4	105.1
Industrial Raw Materials†	120.9	121.0	119.7	116.0
Manufactured Products†	104.3	104.3	103.4	101.8

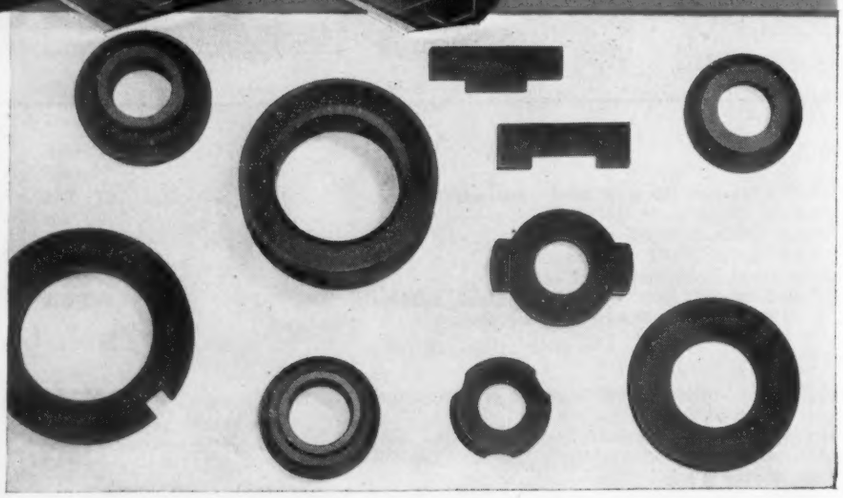
†Bureau of Labor Statistics Index = 100.

450° F. OVEN HEAT DOESN'T FAZE graphitar CONVEYOR BEARINGS

GRAPHITE

Graphitar will not melt or fuse at any temperature. A carbon-graphite substance, it is ideal for bearings in industrial ovens which process materials at temperatures up to 650° F. in the presence of air and up to 2500°F. in a neutral or reducing atmosphere. In installations subject to continuous operation and extreme heat, you can depend on Graphitar bearings for top efficiency at rock bottom maintenance costs.





USED THROUGHOUT INDUSTRY

In scores of installations demanding resistance to friction, heat, and chemical attack, Graphitar parts perform dependably. Graphitar compressor and fluid coupling seals, clutch release bearings, glass molds, centrifugal pump bearings, and wearing rings are but a few of the many successful Graphitar applications. Graphitar is light-weight and can be ground to tolerances as close as .0005", in small sizes. See listing in Sweet's (Designer's File) and **write today for new 44 page catalog.**

THE UNITED STATES GRAPHITE COMPANY • SAGINAW, MICHIGAN

MARKET SUMMARY

Pinch in Steel Tightens As Coal Strike Proceeds

Curtailed pig iron output precedes cut in ingot production . . . Building curb shows little effect yet . . . Stainless steel advanced

FOR the second time this year a major nation-wide strike is beginning to have its effect on steel production. After the steel strike, which cost loss of close to 8 million tons of ingots, stoppage of soft coal mining is causing curtailment of steel production, which promises to be intensified if the strike lasts many weeks.

During the first few days of the coal strike steel production was well sustained but early curtailment in pig iron production as blast furnaces were shut down for lack of coke promised a subsequent drop in steel output, likely to increase steadily. Whatever the eventual loss in steel production because of fuel shortage it can be ill afforded as never in peacetime have needs for steel been as heavy. In all major lines of steel, deliveries are becoming further deferred and an increasing number of producers are entirely out of the market, having committed themselves on all tonnage likely to be made this year.

Most critical items now are small hot-rolled carbon bars, narrow hot-rolled strip, cold-rolled sheets, galvanized and electrical sheets and pipe. Production of electrical sheets, on which there was a recent increase of $12 per ton, has been enlarged somewhat in the Chicago district. No appreciable increase in this grade is expected before September, when new facilities should be ready for operation. It is estimated this new capacity will add 5000 to 6000 tons per month, bringing total production to about 45,000 tons per month. However, there still will be a shortage in electrical sheets, needed for small motors for household appliances.

Galvanized sheets promise to be even scarcer than at present. Demand continues to accumulate and the housing program will add to this total. Meanwhile, no new facilities for galvanized sheets are scheduled to be brought into operation before next year and apparently not much such capacity. Not all existing facilities are being fully utilized at present because of lack of trained workers.

In spite of the new construction limitation order planned to facilitate the housing program, no early material easing is expected in the position of shape mills. With substantial backlogs, practically all shape mills are quoting late second half delivery. There will be adjustments in schedules as time goes on, with less tonnage of heavy shapes, as suspension of nonresidential types of construction is applied.

Already production of consumer goods is being hampered by lack of steel and this condition is expected to become increasingly evident under present difficulties.

Steelworks operations last week began to show effects of the fuel shortage, the estimated national rate declining 8 points to 81½ per cent of capacity. Most of this decline was in the Pittsburgh and Youngstown districts, where coal and coke stocks were low. Pittsburgh dropped 28 points to 68½ per cent, Youngstown 10 points to 78 per cent, Detroit 8 points to 80, eastern Pennsylvania 3 points to 84, Cincinnati 4 points to 77 and New England 2 points to 92. Some slight gains were made, Cleveland rising 1 point to 96½, Wheeling 4½ to 90½, Buffalo 4½ to 90½ and Chicago 1 point to 92. Birmingham was unchanged at 95 per cent and St. Louis at 49½ per cent.

Scrap shortage persists and consumers are taking all material offered. Should steelmaking be cut down for any length of time it is hoped stocks may be increased during the lull, providing material for renewed steel production after the strike.

Several more stainless steel producers have advanced base prices and extras on all stainless products 8.2 per cent. Action on this increase was delayed by these steelmakers for some time after other higher prices were put into effect. OPA has allowed an increase of 7 per cent in base prices of bolts, nuts, screws and rivets, effective Apr. 1.

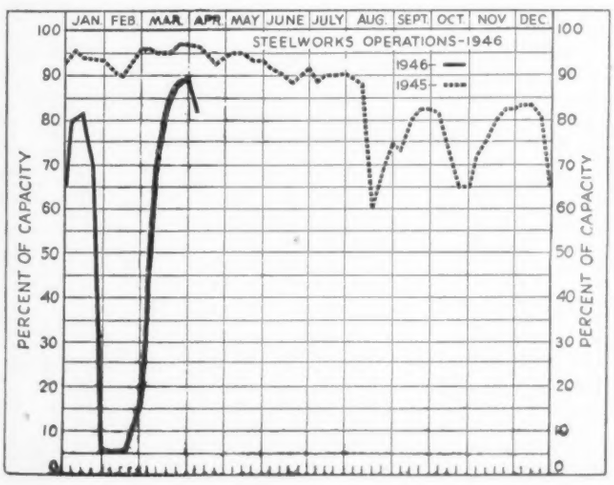
Average composite prices of steel and iron products have undergone no change since the increases recently allowed by Office of Price Administration. Finished steel composite remains at $63.54, semifinished steel at $40.60, steelmaking pig iron at $25.50 and steelmaking scrap at $19.17.

DISTRICT STEEL RATES

(Percentage of Ingot Capacity Engaged in Leading Districts)

	Week Ended Apr. 6	Change	Same Week 1945	Same Week 1944
Pittsburgh	68.5	—28	91.5	94
Chicago	92	+ 1	101	101
Eastern Pa.	84	— 3	95	95
Youngstown	78	— 6	93	95
Wheeling	90.5	+ 4.5	93.5	100
Cleveland	96.5	+ 1	93.5	92.5
Buffalo	90.5	+ 4.5	90.5	90.5
Birmingham	95	None	95	95
New England	92	— 2	90	87
Cincinnati	77	— 4	86	91
St. Louis	49.5	None	80	80
Detroit	80	— 8	90	87
Estimated national rate	81.5	— 8	96.5	99.5

*Based on steelmaking capacities as of these dates.



COMPOSITE MARKET AVERAGES

	Apr. 6	Mar. 30	Mar. 23	One Month Ago Mar., 1946	Three Months Ago Jan., 1946	One Year Ago Apr., 1945	Five Years Ago Apr., 1941
Finished Steel	$63.54	$63.54	$63.54	$63.54	$58.27	$57.55	$56.73
Semifinished Steel	40.60	40.60	40.60	40.60	37.80	36.00	36.00
Steelmaking Pig Iron	25.50	25.50	25.50	25.125	24.75	24.00	23.00
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for last Month, Three Months and One Year Ago

Finished Material, cents per lb.; coke, dollars per net ton; others dollars per gross ton.

Finished Material	Apr. 6, 1946	Mar., 1946	Jan., 1946	Apr., 1945
Steel bars, Pittsburgh	2.50c	2.50c	2.25c	2.15c
Steel bars, Philadelphia	2.82	2.82	2.57	2.47
Steel bars, Chicago	2.50	2.50	2.25	2.15
Shapes, Pittsburgh	2.35	2.35	2.10	2.10
Shapes, Philadelphia	2.465	2.465	2.215	2.215
Shapes, Chicago	2.35	2.35	2.10	2.10
Plates, Pittsburgh	2.50	2.50	2.25	2.20
Plates, Philadelphia	2.55	2.55	2.30	2.25
Plates, Chicago	2.50	2.50	2.25	2.20
Sheets, hot-rolled, Pittsburgh	2.425	2.425	2.20	2.20
Sheets, cold-rolled, Pittsburgh	3.275	3.275	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	4.05	4.05	3.70	3.65
Sheets, hot-rolled, Gary	2.425	2.425	2.20	2.20
Sheets, cold-rolled, Gary	3.275	3.275	3.05	3.05
Sheets, No. 24 galv., Gary	4.05	4.05	3.70	3.65
Hot-rolled strip, over 6 to 12-in., Pitts.	2.35	2.35	2.10	2.10
Cold-rolled strip, Pittsburgh	3.05	3.05	2.80	2.80
Bright bess., basic wire, Pittsburgh	3.05	3.05	2.75	2.60
Wire nails, Pittsburgh	3.25	3.25	2.90	2.80
Tin plate, per base box, Pittsburgh	$5.25	$5.25	$5.00	$5.00
Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$38.00	$38.00	$36.00	$34.00
Slabs, Pittsburgh, Chicago	39.00	39.00	36.00	34.00
Rerolling billets, Pittsburgh	39.00	39.00	36.00	34.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	2.30c	2.30c	2.15c	2.00c

Pig Iron	Apr. 6, 1946	Mar., 1946	Jan., 1946	Apr., 1945
Bessemer, del. Pittsburgh	$27.69	$27.315	$26.94	$26.19
Basic, Valley	26.00	25.625	25.25	24.50
Basic, eastern del. Philadelphia	27.84	27.465	27.09	26.34
No. 2 fdry., del. Pgh. N. & S. sides	27.19	26.815	26.44	25.69
No. 2 foundry, Chicago	26.50	26.125	25.75	25.00
Southern No. 2, Birmingham	22.88	22.505	22.13	21.38
Southern No. 2, del. Cincinnati	26.80	26.425	26.05	25.36
No. 2 fdry., del. Philadelphia	28.34	27.965	27.59	26.84
Malleable, Valley	26.50	26.125	25.75	25.00
Malleable, Chicago	26.50	26.125	25.75	25.00
Lake Sup., charcoal del. Chicago	37.34	37.340	37.34	37.34
Gray forge, del. Pittsburgh	26.69	26.315	25.94	25.19
Ferromanganese, del. Pittsburgh	140.00	140.000	140.00	140.33
Scrap				
Heavy melting steel, No. 1, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke				
Connellsville, furnace ovens	$7.50	$7.50	$7.50	$7.00
Connellsville, foundry ovens	8.25	8.25	8.25	7.75
Chicago, by-product fdry., del.	13.75	13.75	13.75	13.35

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA schedules, except those for stainless steels which are now exempt from price control. Price schedule No. 6 covers semifinished and finished iron and steel products; by-product foundry coke, No. 29; relaying rails, No. 46; beehive oven coke, No. 77; bolts, nuts and rivets, No. 147; coke by-products, GMPR, except sulphate of ammonia, No. 205. Finished steel quoted in cents per pound and semifinished steel in dollars per gross ton, except as otherwise noted. Pricing on rails was changed to net ton basis as of Feb. 15, 1946.

Semifinished Steel

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $33.

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop, $46.80.

Rerolling, Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $39; Detroit, del., $41; Duluth (bll), $41; Pac. ports (bll), $51. (Andrews Steel Co., carbon slabs, $41; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co. $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $47; Detroit, del., $49; Duluth, billets, $49; forg. bll. f.o.b. Pac. ports, $59.

(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co. $64.64, Pacific ports.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $56.16, del. Detroit $58.16, eastern Mich. $59.16.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $38. (Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 2.05c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—$\frac{7}{32}$ in. inclusive, per 100 lbs., $2.30. Do., over $\frac{7}{32}$—$\frac{47}{64}$-in., incl., $2.45; Galveston, base, $2.40 and $2.55, respectively. Worcester add $0.10; Pacific ports $0.50.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham base, 20 tons one size, 2.50c; Duluth, base, 2.60c; Detroit, del., 2.60c; eastern Mich., 2.65c; New York, del., 2.84c; Phila., del., 2.82c; Gulf ports, dock, 2.85c; Pac. ports, dock, 3.15. (Sheffield Steel Corp., 2.75c, fob St. Louis.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.81c; Detroit, del., 2.91c. (Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(•Basic O-H)	AISI Series	(•Basic O-H)
1300	$0.104	4300	1.768
2300	1.768	4600	1.248
2500	2.652	4800	2.236
3000	0.52	5100	0.364
3100	0.884	5130 or 5152	0.468
3200	1.404	6120 or 6152	0.988
3400	3.328	6145 or 6150	1.248
4000	0.468	8612	0.676
4100 (.15-.25 Mo)	0.728	8720	0.728
(.20-.30 Mo)	0.78	9830	1.352

• Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lbs., 3.10c; Detroit, 3.15c; Toledo, 3.25c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 3.48c; Detroit, del., 3.58c; eastern Mich., 3.63c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.35c; Detroit, del., 2.45c; eastern Mich. and Toledo, 2.50c; Gulf ports, dock, 2.70c; Pacific ports, dock, 2.75c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.35c; Detroit, del., 2.45c; eastern Mich. and Toledo, 2.50c; Gulf ports, dock, 2.70c.

Iron Bars: Single refined, Pitts., 4.76c; double refined, 5.84c; Pittsburgh, staybolt, 6.22c; Terre Haute, single ref., 5.42c; double ref., 6.76c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base, 2.425c; Granite City, base, 2.525c; Detroit, del., 2.525c; eastern Mich., 2.575c; Phila., del., 2.595c; New York, del., 2.665c; Pacific ports, 2.975c.

(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.60c on hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.275c; Granite City, base, 3.375c; Detroit, del., 3.375c; eastern Mich., 3.425c; New York, del., 3.615c; Phila., del., 3.595c; Pacific ports, 3.925c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 4.05c; Granite City, base, 4.15c; New York, del., 4.29c; Phila., del., 4.22c; Pacific ports, 4.60c.

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29-gage, per square, 3.73c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16-gage not corrugated, copper alloy, 4.15c; Granite City, 4.25c; Pacific ports, 4.60c; copper iron, 4.50c; pure iron, 4.50c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.60c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.20c; Granite City, base 3.30c; Detroit, del., 3.30c; eastern Mich., 3.35c; Pacific ports, 3.85c; 20-gage: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.80c; Detroit, del., 3.90c; eastern Mich., 3.95c; Pacific ports, 4.45c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.90c	4.65c	4.00c
Armature	4.25c	5.00c	4.35c
Electrical	4.75c	5.50c	4.85c
Motor	5.425c	6.175c	5.525c
Dynamo	6.125c	6.875c	6.225c
Transformer			
72	6.625c	7.375c	.....
65	7.625c	8.375c	.....
58	8.125c	8.875c	.....
52	8.925c	9.675c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Pirmingham, Youngstown, Middletown base, 6-inch and narrower, 2.45c; Detroit, del., 2.55c; eastern Mich., 2.60c; Pacific ports, 3.10c; over 6-inch, base, 2.35c; Detroit, del., 2.45c; eastern Mich., 2.50c; Pacific ports, 3.00c.

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less, 3.05c; Chicago, base, 3.15c; Detroit, del., 3.15c; eastern Mich., 3.20c; Worcester, base, 3.25c.

Cold Finished Spring Steel: Pittsburgh, Cleveland, bases, add 20c for Worcester; .26-.50 Carb., 3.05c.

Tin, Terne Plate

(OPA ceiling prices announced March 1, 1946.)

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.25; Granite City, Birmingham, Sparrows Point, $5.35.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.25 lb. tin, $4.60; 0.50 lb. tin, $4.75; 0.75 lb. tin, $4.90; Granite City, Birmingham, Sparrows Point, $4.70, $4.85, $5.00, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29-gage and lighter, 3.30c; Granite City, Birmingham, Sparrows Point, 3.40c; Pacific ports, boxed, 4.30c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted, 4.05c; Pacific ports, 4.80c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-base box, $4.55; Granite City, Birmingham, Sparrows Point: $4.65.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb. $12.50; 20-lb. $15.50 (Nom.); 40-lb. $20.00 (Nom.).

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.50c; New York, del., 2.69c; Phila., del., 2.55c; St. Louis, 2.74c; Boston, del., 2.82-3.07c; Pacific ports, 3.05c; Gulf ports, 2.85c.

(Granite City Steel Co. may quote carbon plates 2.65c f.o.b. D.P.C. mill; Geneva Steel Co., Provo, Utah, 3.20c f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.75c; Pacific ports, 4.40c; Gulf ports, 4.10c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.75c; Gulf ports, 4.20c; Pacific ports, 4.40c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.35c; New York, del., 2.52c; Phila., del., 2.465c; Pacific ports, 3.00c; Gulf ports, 2.70c.

(Phoenix Iron Co., Phoenixville, Pa., may quote the equivalent of 2.45c, Bethlehem, Pa., on the general range and 2.55c on beams and channels from 4 to 10 inches.)

Steel Piling: Pittsburgh, Chicago, Buffalo, 2.65c; Pacific ports, 3.20c.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham, per 100 pounds)

Wire to Manufacturers in carloads	
Bright basic or bessemer	*$3.05
Spring (except Birmingham)	*$3.65
Wire Products to Trade	
Nails and staples	
Standard and cement-coated	†$3.25
Galvanized	††$2.90
Wire, Merchant Quality	
Annealed	§$3.50
Galvanized	§$3.85

(Fob Pittsburgh, Chicago, Cleveland, Birmingham, per base column)

Woven fence, 15½ gage and heavier	72
Barbed wire, 80-rod spool	79
Barbless wire, twisted	79
Fence posts	74
Bale ties, single loop	72½

* Add $0.10 for Worcester, $0.05 for Duluth and $0.50 for Pacific ports.

† Add $0.30 for Worcester, $0.50 for Pacific ports.

†† Add $0.50 for Pacific ports.

§ Add $0.10 for Worcester, $0.70 for Pacific ports.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

	Steel			Iron	
In.	Blk.	Galv.	In.	Blk.	Galv.
⅛	53	30	½	21	0½
¼ & ⅜	56	37½	⅝	27	7
½	60½	48	1-1¼	31	13
¾	63½	52	1½	35	15½
1-3	65½	54½	2	34½	15

Lap Weld

	Steel			Iron	
In.	Blk.	Galv.	In.	Blk.	Galv.
2	58	46½	1¼	20	0½
2½-3	61	49½	1½	25½	7
3½-6	63	51½	2	27½	9
7-8	62	49½	2½-3½	28½	11½
9-10	61½	49	4	30½	15
11-12	60½	48	4½-8	29½	14
			9-12	25½	9

Boiler Tubes: Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

		—Seamless—		—Elec. Weld—	
O.D. sizes	B.W.G.	Hot Rolled	Cold Drawn	Hot Rolled	Cold Rolled
1"	13	.....	$9.90	$9.36	$9.65
1¼"	13	.....	11.73	9.63	11.43
1½"	13	$10.91	12.96	10.63	12.64
1¾"	13	12.41	14.75	12.10	14.37
2"	13	13.90	16.52	13.53	16.19
2¼"	13	15.50	18.42	15.06	18.03
2¼"	12	17.07	20.28	16.57	19.83
2½"	12	18.70	22.21	18.11	21.68
2¾"	12	19.82	23.54	19.17	22.95
3"	12	20.79	24.71	20.05	24.02
3½"	11	26.24	31.18	25.30	30.29
4"	10	32.56	38.68	31.32	37.52
4½"	9	43.16	51.29	.....	.....
5"	9	49.96	59.36	.....	.....
6"	7	76.71	91.14	.....	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, net ton, $43.40. Light rails (billet), Pittsburgh, Chicago, Birmingham, net ton, $49.18.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates $51 net ton, base, Standard spikes, 3.65c.

* Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb.; Reg. carbon 15.15c; extra carbon 19.48c; special carbon 23.80c; oil-hardening 25.97c; high car.-chr. 46.53c.

Tung.	Chr.	Van.	Moly.	Base, per lb.
18.00	4	1	...	72.49c
1.5	4	1	8.5	58.43c
....	4	2	3	58.43c
6.40	4.15	1.90	5	62.22c
5.50	4.50	4	4.50	75.74c

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $2.75-$3.00 off

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago. Additional discounts: 5 for carloads; 10 for full containers, except tire, step and plow bolts.

(Ceiling prices advanced 7 per cent, effective Apr. 1, 1946; discounts remain unchanged.)

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅝ and ⅝ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages, nuts separate, 71-10 off, nuts attached, 71 off; bulk, 80 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hex	U.S.S.	S.A.E.
⅞-in. and smaller	..	64
1-in. and smaller	62	..
1⅛-in.-1-in.	..	60
1⅛-in.-1 in.	59	..
1⅛-in.-1½-in.	57	58
1⅝-in. and larger	56	..

Additional discount of 10 for full kegs.

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset 1-in. and smaller	71 off
Headless, ¼-in. and larger	60 off
No. 10 and smaller	70 off

Stainless Steels

(Open market prices. OPA price control suspended Oct. 11, 1945.)

Base, Cents per lb.

	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEELS					
302	25.96c	29.21c	36.79c	23.93c	30.30c
303	28.13	31.38	38.95	29.21	35.71
304	27.05	31.38	38.95	25.45	32.46
308	31.38	36.79	44.36	30.84	37.87
309	38.95	43.28	50.85	40.03	50.85
310	53.02	56.26	57.35	52.74	60.59
312	38.95	43.28	53.02	.....	.....
*316	43.28	47.61	51.94	43.28	51.94
†321	31.38	36.79	44.36	31.65	41.12
†347	35.71	41.12	48.69	35.71	45.44
431	20.56	23.80	31.38	18.94	24.35
STRAIGHT CHROMIUM STEEL					
403	23.93	26.51	21.92	22.99	29.21
**410	20.02	23.93	28.67	18.39	23.80
416	20.56	23.80	29.21	19.75	25.45
††420	25.96	30.84	36.25	25.70	39.49
430	20.56	23.80	31.38	18.94	24.35
‡‡430F	21.10	24.35	31.92	20.29	26.51
440A	25.96	30.84	36.25	25.70	39.49
442	24.35	27.59	35.17	25.96	34.62
443	24.35	27.59	35.17	25.96	34.62
446	29.76	33.00	39.49	37.87	56.26
501	8.66	12.98	17.04	12.98	18.39
502	9.74	14.07	18.12	14.07	19.48
STAINLESS CLAD STEEL (20%)					
304	.....	§§19.48	20.56	.....	.....

*With 2-3% moly. §With titanium. ††With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*7.50
Connellsville, foundry	8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75
By-Product Foundry	
Kearney, N. J., ovens	13.05
Chicago, outside delivered	13.00
Chicago, delivered	13.75
Terre Haute, delivered	13.50
Milwaukee, ovens	13.75
New England, delivered	14.65
St. Louis, delivered	†13.75
Birmingham, delivered	10.90
Indianapolis, delivered	13.50
Cincinnati, delivered	13.25
Cleveland, delivered	13.20
Buffalo, delivered	13.40
Detroit, delivered	13.75
Philadelphia, delivered	13.28

*Operators of hand-drawn ovens using trucked coal may charge $8.00; effective May 26, 1945. †14.25 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha	
Pure and 90% benzol	15.00c
Toluol, two degree	27.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	10.50c
Do., less than car lots	11.25c
Do., tank cars	9.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras. Quotations based on OPA mill prices announced March 1, 1946.

	Hot-rolled bars	Structural shapes	Plates	Floor plates	Hot-rolled sheets (10-gage base)	Hot-rolled strip (14-gage and lighter, 6-in and narrower)	Hot-rolled strip (12-gage and heavier wider than 6-inch)	Galvanized flat sheets (24-gage base)	Cold-rolled sheets (17-gage base)	Cold finished bars	Cold-rolled strip
Boston	4.294[1]	4.162[1]	4.162[1]	5.977[1]	3.999[1]	5.456[1]	4.356[1]	5.674[14]	4.969[14]	4.594[11]	4.965
New York	4.103[1]	4.008[1]	4.018[1]	5.824[1]	3.815[1]	4.324[1]	4.224[1]	5.460[12]	4.838[14]	4.553[21]	5.024
Jersey City	4.103[1]	3.997[1]	4.018[1]	5.824[1]	3.815[1]	4.324[1]	4.224[1]	5.460[12]	4.838[14]	4.553[21]	5.024
Philadelphia	4.072[1]	3.916[1]	3.855[1]	3.768[1]	3.743[1]	4.622[1]	4.172[1]	5.468[15]	5.097[25]	4.022[21]	5.022
Baltimore	4.052[1]	4.009[1]	3.844[1]	5.502[1]	3.619[1]	4.602[1]	4.152[1]	5.344[1]	5.077[25]	4.502[21]	.....
Washington	4.191[1]	4.180[1]	4.046[1]	5.591[1]	3.821[1]	4.741[1]	4.291[1]	5.646[17]	5.066[20]	4.491[21]	.....
Norfolk, Va.	4.315[1]	4.252[1]	4.221[1]	5.715[1]	3.996[1]	4.865[1]	4.415[1]	5.821[17]	4.490[24]	4.615[21]	.....
Bethlehem, Pa.*	.....	3.70[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.70[1]	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.70[1]	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.60[1]	3.65[1]	3.88[1]	5.51[1]	3.575[1]	4.169[1]	4.069[1]	5.20[15]	4.625[10]	4.20[21]	4.919
Buffalo (country)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.475[1]	3.85[1]	4.060[1]	5.10[15]	4.525[10]	4.10[21]	4.60
Pittsburgh (city)	3.60[1]	3.65[1]	3.65[1]	5.25[1]	3.575[1]	3.95[1]	3.850[1]	5.20[12]	4.625[24]	4.20[21]	4.70
Pittsburgh (country)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.475[1]	3.85[1]	3.750[1]	5.10[12]	4.525[24]	4.10[21]	4.60
Cleveland (city)	3.60[1]	3.838[1]	3.65[1]	5.438[1]	3.575[1]	3.95[1]	3.850[1]	5.327[12]	4.625[24]	4.20[21]	4.70
Cleveland (country)	3.50[1]	.....	3.55[1]	.....	3.475[1]	3.85[1]	3.750[1]	.....	4.525[24]	4.10[21]	4.60
Detroit	3.70[1]	3.911[1]	3.859[1]	5.531[1]	3.675[1]	4.050[1]	3.950[1]	5.450[12]	4.725[24]	4.25[12]	4.909
Omaha (city, del.)	4.293[1]	4.343[1]	4.343[1]	5.943[1]	4.018[1]	4.493[1]	4.393[1]	5.965[15]	5.668[24]	4.893[21]	.....
Omaha (country)	4.193[1]	4.243[1]	4.243[1]	5.843[1]	3.918[1]	4.393[1]	4.293[1]	5.865[15]	.....	.....	.....
Cincinnati	3.861[1]	3.941[1]	3.911[1]	5.541[1]	3.650[1]	4.025[1]	3.925[1]	5.275[12]	4.700[24]	4.461[21]	4.961
Youngstown*	.....	.....	.....	.....	.....	.....	.....	4.85[13]	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.475[1]	3.85[1]	3.750[1]	5.10[16]	.....	.....	.....
Chicago (city)	3.75[1]	3.80[1]	3.80[1]	5.40[1]	3.475[1]	3.95[1]	3.850[1]	5.681[15]	4.425[24]	4.20[21]	4.90
Milwaukee	3.887[1]	3.937[1]	3.937[1]	5.537[1]	3.612[1]	4.087[1]	3.987[1]	5.722[15]	4.562[24]	4.337[21]	5.037
Indianapolis	3.83[1]	3.88[1]	3.88[1]	5.48[1]	3.743[1]	4.118[1]	4.018[1]	5.368[15]	4.793[24]	4.43[21]	5.030
St. Paul	4.01[2]	4.06[2]	4.06[2]	5.66[2]	3.735[2]	4.21[2]	4.110[2]	5.707[15]	4.685[24]	4.811[21]	5.352
St. Louis	3.924[1]	3.947[1]	3.947[1]	5.547[1]	3.622[1]	4.097[11]	3.997[1]	5.622[15]	4.572[24]	4.481[21]	5.181
Memphis, Tenn.	4.265[1]	4.315[1]	4.315[1]	6.03[1]	4.190[1]	4.565[1]	4.465[2]	5.715[15]	5.005[24]	4.78[21]	.....
Birmingham	3.65[1]	3.80[1]	3.80[1]	6.153[1]	3.675[1]	4.05[1]	3.950[1]	5.20[15]	5.077[24]	4.99[21]	5.465
New Orleans (city)	4.35[4]	4.15[4]	4.15[4]	6.10[4]	4.283[4]	4.55[4]	4.450[4]	5.70[20]	5.304[10]	5.05[21]	5.679
Houston, Tex.	4.00[3]	4.50[1]	4.50[1]	5.75[3]	3.988[3]	4.663[2]	4.563[6]	5.763[20]	5.819[10]	4.10[22]	.....
Los Angeles	4.65[4]	4.90[4]	5.20[4]	7.45[4]	5.225[4]	7.10[4]	5.200[4]	6.45[12]	7.425[6]	6.033[22]	5.863
San Francisco	4.40[7]	4.60[7]	4.90[7]	6.60[7]	4.775[7]	6.10[7]	4.750[7]	6.80[15]	7.525[15]	5.783[21]	7.583
Portland, Oreg.	4.70[27]	4.70[27]	5.00[27]	6.75[27]	4.875[27]	6.65[27]	5.000[27]	6.20[15]	6.825[15]	5.983[15]	.....
Tacoma, Wash.	4.60[6]	4.70[6]	5.00[6]	6.75[6]	4.875[6]	5.80[6]	4.500[6]	6.40[15]	7.825[15]	6.233[21]	.....
Seattle	4.70[6]	4.70[6]	5.00[6]	6.75[6]	4.875[6]	5.80[6]	4.500[6]	6.40[15]	7.275[15]	6.233[21]	.....

*Basing point cities with quotations representing mill prices, plus warehouse spread.
NOTE—All prices fixed by Office of Price Administration in Revised Price Schedule No. 49, as amended. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$4.95
Mesabi nonbessemer	4.55
High phosphorus	4.55
Mesabi bessemer	4.70
Old range nonbessemer	4.80

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Swedish basic, 60 to 68%	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese Wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.
(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$39.75
48% 3:1	41.00
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80

Brazilian—nominal

44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50

Rhodesian

45% no ratio	$28.30
48% no ratio	31.00
48% 3:1 lump	41.00

Domestic (seller's nearest rail)

48% 3:1	$43.50

less $7 freight allowance.

Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 248, effective May 15, 1944. Price at basing points which are also points of discharge of imported manganese ore is fob cars, shipside, at dock most favorable to the buyer. Outside shipments direct to consumers at 10c per unit less than Metal Reserve Co. prices.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent: Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furnace: per 100 lb. Bars	Billets per GT	per 100 lb. Bars	Billets per GT
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	$0.780	$15.60	$1.300	$26.00
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.780	15.60	1.300	26.00
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.832	16.64	1.352	27.04
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.676	13.52	1.196	23.92
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.248	24.96	1.612	32.24
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.248	24.96	1.612	32.24

Extras are in addition to a base price of 2.808c, per pound on finished products and $56.16 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximum fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, Oct. 23, 1945, and March 15, 1946. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$27.50	$27.00	$28.50	$28.00
Newark, N. J., del.	29.03	28.53	30.03	29.53
Brooklyn, N. Y., del.	30.00	.....	.....	30.50
Birdsboro, Pa., base	27.50	27.00	28.50	28.00
Birmingham, base	22.88	21.50	27.50	.....
Baltimore, del.	28.11	.....	.....	.....
Boston, del.	27.64	.....	.....	.....
Chicago, del.	26.72	.....	.....	.....
Cincinnati, del.	26.56	25.23	.....	.....
Cleveland, del.	26.62	25.74	.....	.....
Newark, N. J.	28.64	.....	.....	.....
Philadelphia, del.	27.96	27.46	.....	.....
St. Louis, del.	26.62	27.54	.....	.....
Buffalo, base	26.50	26.50	27.50	27.00
Boston, del.	28.00	27.00	29.00	28.50
Rochester, del.	28.08	.....	29.03	28.53
Syracuse, del.	28.58	.....	29.58	29.08
Chicago, base	26.50	26.00	27.00	26.50
Milwaukee, del.	27.60	27.10	28.10	27.60
Muskegon, Mich., del.	27.69	.....	.....	27.69
Cleveland, base	26.50	26.00	27.00	26.50
Akron, Canton, del.	27.89	27.39	28.39	27.89
Detroit, base	26.50	26.00	27.00	26.50
Saginaw, Mich., del.	28.81	28.31	29.31	28.81
Duluth, base	27.00	26.50	27.50	27.00
St. Paul, del.	29.13	28.63	29.63	29.13
Erie, Pa., base	26.50	26.00	27.50	27.00
Everett, Mass., base	27.50	27.00	28.50	28.00
Boston, del.	28.00	27.50	29.00	28.50
Granite City, Ill., base	26.50	26.00	27.00	26.50
St. Louis, del.	27.00	26.50	.....	27.00
Hamilton, O., base	26.50	26.00	.....	26.50
Cincinnati, del.	27.61	27.11	.....	27.61
Neville Island, Pa., base	26.50	26.00	27.00	26.50
§Pittsburgh, del. No. & So. sides	27.19	26.69	27.69	27.19
Provo, Utah, base	24.50	24.00	.....	.....
Sharpsville, Pa., base	26.50	26.00	27.00	26.50
Sparrows Point, base	27.50	27.00	.....	.....
Baltimore, del.	28.49	.....	.....	.....
Steelton, Pa., base	.....	27.00	.....	.....
Swedeland, Pa., base	27.50	27.00	28.50	28.00
Philadelphia, del.	28.34	27.84	.....	28.04
Toledo, O., base	26.50	26.00	27.00	26.50
Youngstown, O., base	26.50	26.00	27.00	26.50
Mansfield, O., del.	28.44	27.94	28.94	28.44

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent (base)	....$32.00		
6.51-7.00	$33.00	9.01- 9.50	38.00
7.01-7.50	34.00	9.51-10.00	39.00
7.51-8.00	35.00	10.01-10.50	40.00
8.01-8.50	36.00	10.51-11.00	41.00
8.51-9.00	37.00	11.01-11.50	42.00

F.o.b. Jackson county, O., per gross ton. Buffalo base $1.25 higher, whichever is most favorable to buyer. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50 Jackson Co.; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.005 Phos., 0.40 Sulphur, 1.0% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn. $34.00
Chicago, del. 37.34

Southern

Semi-cold blast, low phos.

f.o.b. furnace, Lyles, Tenn. $33.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $26.00
Valley base 26.00

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., $32.00 base; $33.24, del. Philadelphia. Intermediate phos., Central Furnace, Cleveland, $29.00.

Switching Charges: Basing Point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exception to Ceiling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable.

Refractories

Per 1000 f.o.b. Works. Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky. $68.50

High Heat Duty

Pa., Ill., O., Md., Mo., Ky.	54.40
Ala., Ga.	54.40
N. J.	59.35

Intermediate Heat Duty

Ohio	47.70

Low Heat Duty

Pa., Ill., Md., Mo., Ky.	49.35
Ala., Ga.	40.30
N. J.	52.00
Ohio	38.15

Malleable Bung Brick

All bases	63.45

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press	32.85
Wire Cut	30.75

Silica Brick

Pennsylvania	54.40
Joliet, E. Chicago	62.45
Birmingham, Ala.	54.40

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded Magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net tons, carloads, CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. After Aug. 29, 1944, base price any grade $30.00.

Ferroalloy Prices

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Rockdale or Rockwood, Tenn. (where Tennessee Products Co. is producer), Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140 fob cars, Pittsburgh (where Carnegie-Illinois Steel Corp. is producer); add $6 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: Special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.55c; regular, 21.05c; medium, 15.75c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Spiegeleisen: 19-21% carlot per gross ton, Palmerton, Pa., $36; Pittsburgh, $40.50; Chicago, $40.60.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6c.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l. 80c; central 81c and 82.50c; western 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60% per lb. contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l. 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome; Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l. max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65 for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr. high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom: 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium, 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silicaz Alloy: (Sil. 35-40% cal. 9-11%, alum. 5-7%, zir. 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir. 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western; spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max. sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract ton lots, $1.89, less $2.01, eastern; freight allowed; $1.903 and $2.023, central, $1.935 and $2.055 western; spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 ton, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide, approx. 2%, or Red Cake: Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed per pound vanadium oxide contained; contract carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; cast: Contract ton lots or more $1.35, less, $1.60, pound of metal; $1.36 and $1.61 central, $1.40 and $1.65, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, carlot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, carlots, bulk .0605c, packed .063c, tons .0655c, less .068c eastern freight allowed; .063c, .0655c, .0755c and .078c, central; .066c, .0685c, .0855c and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all f.o.b. Bridgeville, Pa., usual freight allowance.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c; 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

Manganese Metal: (96% min. manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 30c, 2000 lb. to c.l., 32c, central, 30.25c, and 33c; western 30.55c and 35.05c.

Ferrotungsten: Spot, 10,000 lb. or more, per lb. contained tungsten, $1.90; contract, $1.88; freight allowed as far west as St. Louis.

Tungsten Metal Powder: Spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6.8% carbon $142.50; 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.15% net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium.

Bortam: Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: 12-15%, per lb. of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, Eastern, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.50c; ton lots 6.00c. Spot ½ cent higher.

Siminal: (Approx. 20% each Si., Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

Borosil: 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Bo., f.o.b. Philo, O., freight not exceeding St. Louis rate allowed

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to maximum price regulation No. 4. Quotations are on gross tons.

PHILADELPHIA:
(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Mixed Borings, Turnings	13.75
Machine Shop Turnings	13.75
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25

Cast Grades
(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:
(Dealers' buying prices)

No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turnings	10.33
Mixed Borings, Turnings	10.33
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:
(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	14.50
Short Shovel Turnings	16.50
Mixed Borings, Turnings	14.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.50-14.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

BOSTON:
(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	$14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel Turnings	11.06
Chemical Borings	13.31
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

Boston Differential 99 cents higher, steel-making grades; Providence $1.09 higher.

PITTSBURGH:
(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Mach. Shop Turnings	15.00
Mixed Borings, Turnings	15.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	22.00

VALLEY:
(Delivered consumer's plant)

No. 1 R.R. Heavy Melt.	$21.00
No. 1 Heavy Melt Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Cast Iron Borings	16.00
Machine Shop Turnings	15.00
Low Phos. Plate	22.50

MANSFIELD, O.:
(Delivered consumer's plant)

Machine Shop Turnings	$15.00

BIRMINGHAM:
(Delivered consumer's plant)

Billet Forge Crops	$22.00
Structural, Plate Scrap	19.00
Scrap Rails Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:
(Delivered consumer's plant)

No. 1 R.R. Heavy Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn.	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	13.75
Mix. Borings, Sht. Turn.	13.75
Short Shovel Turnings	15.75
Cast Iron Borings	14.75
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00
(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)	

BUFFALO:
(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	14.25
Short Shovel Turnings	16.25
Mixed Borings, Turn.	14.25
Cast Iron Borings	15.25
Low Phos.	21.75

DETROIT:
(Delivered consumer's plant)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	12.32
Short Shovel, Turnings	14.32
Cast Iron Borings	13.32
Low Phos. Plate	19.82
No. 1 Cast	20.00
Heavy Breakable Cast	16.50

ST. LOUIS:
(Delivered consumer's plant)

Heavy Melting	17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	10.50
Shoveling Turnings	12.50
Rerolling Rails	21.00
Steel Car Axles	21.50-22.00
Steel Rails, 3 ft.	21.50
Steel Angle Bars	21.00
Cast Iron Wheels	20.00
No. 1 Machinery Cast	20.00
Railroad Malleable	22.00
Breakable Cast	16.50
Stove Plate	19.00
Grate Bars	15.25
Brake Shoes	15.25
(Cast grades f.o.b. shipping point)	
Stove Plate	18.00

CINCINNATI:
(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.50
No. 2 Heavy Melt. Steel	18.50
No. 1 Comp. Bundles	18.50
No. 2 Comp. Bundles	18.50
Machine Turnings	9.50-10.00
Shoveling Turnings	11.50-12.00
Cast Iron Borings	11.00-11.50
Mixed Borings, Turnings	10.50-11.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-21.50
Scrap Rails	20.50-21.00
Stove Plate	16.00-16.50

LOS ANGELES:
(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14.00
No. 2 Heavy Melt. Steel	13.00
No. 1, 2 Deal Bundles	12.00
Machine Turnings	4.50
Mixed Borings, Turnings	4.00
No. 1 Cast	20.00

SAN FRANCISCO:
(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$15.50
No. 2 Heavy Melt. Steel	14.50
No. 1 Busheling	15.50
No. 1, No. 2 Bundles	13.50
No. 3 Bundles	9.00
Machine Turnings	7.00
Billet, Forge Crops	15.50
Bar Crops, Plate	15.50
Cast Steel	15.50
Cut, Structural, Plate, 1", under	18.00
Alloy-free Turnings	7.00
Tin Can Bundles	14.50
No. 2 Steel Wheels	15.50
Steel Axles	23.00
No. 2 Cast Steel	15.50
Uncut Frogs, Switches	15.50
Scrap Rails	15.50
Locomotive Tires	15.50

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ⅜c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more; 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.45c, corroding, 6.45, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.00c to 8.25c, Grade 4 (85-90%) 7.75c; any other ingot containing over 1% iron, except PM 754 and hardeners, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb., add 1c for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Price for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, fob plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239. 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224 lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, fob refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Open market, spot, New York, $103-$106 per 76-lb. flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb., for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $7.50 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 70.625c per ounce.

Platinum: $35 per ounce.

Palladium: $24 per troy ounce.

Iridium: $165 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 22.08c; yellow brass 20.81c; commercial bronze, 90% 22.40c, 95% 22.61c; red brass, 80% 21.48c, 85% 21.69c; phosphor bronze, grades A and B 5%, 38.77c; Everdur, Herculoy, Duronze or equiv., 27.33c; naval brass 25.83c; manganese bronze 29.33c; muntz metal 24.08c; nickel silver 5% 28.62c.

Rods: Copper, hot-rolled 18.60c, cold-drawn 19.60c; yellow brass 16.04c; commercial bronze 90% 22.35c, 95% 22.56c; red brass 80% 21.43c, 85% 21.64c; phosphor bronze grades A and B 5% 39.02c; Everdur, Herculoy, Duronze or equiv., 26.53c; naval brass 20.15c; manganese bronze 23.53c; muntz metal 19.90c; nickel silver 5% 30.87c.

Seamless Tubing: Copper 22.42c; yellow brass 23.55c; commercial bronze 90% 24.79c; red brass 80% 24.12c, 85% 24.33c.

Extruded Shapes: Copper 22.10c; architectural bronze 20.15c; manganese bronze 25.03c; muntz metal 21.15c; naval brass 21.40c.

Angles and Channels: Yellow brass 29.31c; commercial bronze 90% 30.90c, 95% 31.11c; red brass 80% 29.98c, 85% 30.19c.

Copper Wire: Soft, fob eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, fob eastern mills, carlots 17.00c, less-carlots 17.50c; magnet, delivered carlots 17.50c, 15,000 lb or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet fob mill, 13.15c; 36,000 lbs. and over deduct 7%; Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

PLATING MATERIALS

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c fob Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c fob Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c fob Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 35.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c fob Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. fob shipping point. Add ⅝c for 15,000-40,000 lbs.; 1c for 40,000 or more.

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.785
Commercial bronze			
90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz Metal	8.000	7.750	7.250
Nickel Sil, 5%	9.250	9.000	4.625
Phos. br., A, B, 5%	11.000	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	8.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are fob shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) Soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) Zincy bronze borings, admiralty condenser tubes, brass pipe 7.50c; muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Price fob point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb., 11, 14, etc., 3 to 3.50c lb. All other high grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less than segregated.

Lead Scrap: Prices fob point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings 7.25c, old zinc 5.25c fob point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices fob point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

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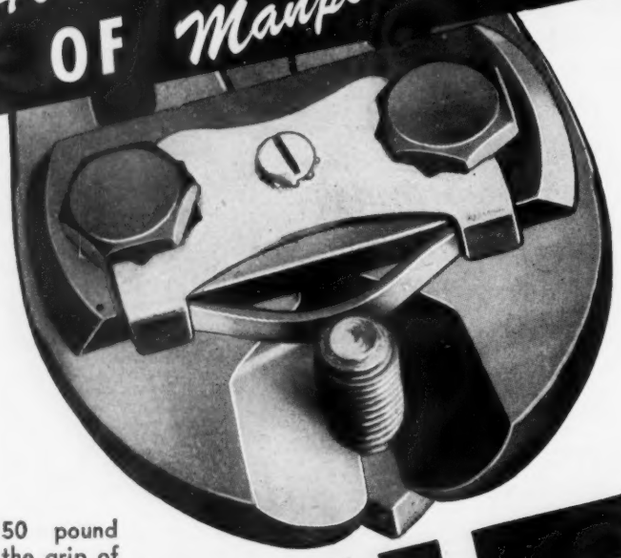

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Sheets, Strip . . .

Sheet & Strip Prices, Page 154

Sheet demand continues strong, consumers pressing for place on mill books, no matter how far into the future. Galvanized and cold-rolled sheets and narrow hot-rolled strip are in most demand, with electrical and stainless sheets also much needed. On these materials most mills are sold through the year and in some cases beyond. Some producers now on a quarterly quota basis are considering advantages of scheduling entire last half instead, to give greater flexibility.

New York — No let up appears in demand for sheets. Despite extended delivery promises, consumers are as active as ever in efforts to get on mill books, apparently always hoping some opening will enable them to get tonnage if not in the near future, perhaps later on. Settlement of strikes at various metalworking plants throughout the district is adding to pressure for tonnage. One large manufacturer of electrical equipment and household appliances is now releasing specifications for all of its various plants,and while tonnage has been on order it is not proving sufficient to meet needs.

Certain leading producers, who have been on a quarterly quota basis are considering setting up quotas for entire last half at one time. They believe in this way greater flexibility in meeting the needs of their regular customers will be provided; and also that it will give buyers a better basis for planning ahead. At least one mill, which is considering this longer range program, may set up quotas on shipments after July 1 within the next week or ten days.

At least one producer of stainless sheets, who had set up quotas for jobbers effective July 1, is now considering establishing all buyers on a quota basis, although in the case of the consumers, orders on the books for last half would not be affected, the effective date for them being Jan. 1.

Boston — Inquiries for several thousand tons of cold strip stock for Springfield, Mass., and Frankford arsenals, including one approximating 1785 tons of cartridge clip steel for Springfield, are for second quarter delivery on numerous items, and, if placed via priority or otherwise, will displace corresponding volume already scheduled. Cold strip producers are unable to make definite delivery promises too far ahead, due to uncertainty as to hot strip shipments and revisions in mill schedules on both grades continue. Meanwhile pressure for strip from consumers is heavy; inventories in many cases are unbalanced. Shoe shank steel and tack plate are in this category.

Cincinnati — District sheet mills are operating at previous levels, with no reflection of the coal mine strike. There is possibbility that reduction in pig iron supply, due to coal shortage, will delay resumption by one district steelmaker. Pressure for delivery of sheets, for position on third quarter and fourth quarter schedules and for more liberal allotments of available tonnage is extremely heavy.

St. Louis — Sheet production here continues shut down because of a strike of independent machinists. The mill is making no shipments, taking no scrap

or pig iron and construction work on a new cold mill has ceased. Order books are filled through 1946. Plate production has been similarly affected.

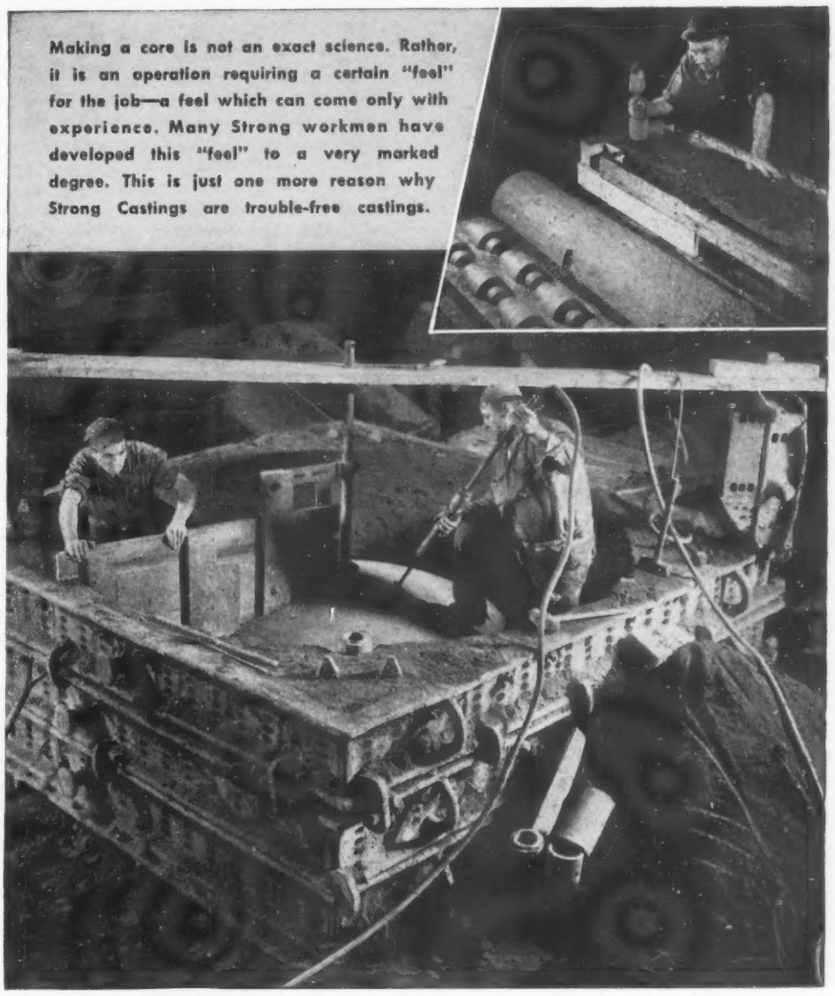
Cleveland—Sheet and strip market tightened last week as sellers attempted to halt further extension in deliveries. Hot-rolled sheets are not available earlier than fourth quarter while light gages extend into first quarter of 1947. Narrow strip is also into first quarter while wider strip deliveries extend into fourth quarter. Operations at some mills already have been cut to a rate of 40 to 50 per cent of normal and other mills will curtail soon unless an early settlement of the coal strike is indicated. Some mills likely will be placed on a 4-day week basis, rather than be closed down completely.

Philadelphia — Certain sheet producers quoting on a quarterly basis may formally open books within the next week or so on specifications for shipment beyond July 1, on a six-months basis. This, it is believed, will allow greater flexibility in scheduling. Those who have not been quoting on a quarterly quota basis are booked solidly for the remainder of the year on practically all grades. Others to all practical purposes also are full for the year, as only regular customers have chance of getting on schedules and they will not be given nearly all they ask, on the basis of the present outlook.

Pittsburgh — The leading steel producer here started immediately to curtail coke oven operations at start of coal strike last week, which in turn adversely affected output of sheets and strip because of the restricted amount of coke oven gas available for reheating furnaces and soaking pits. Shortage of galvanized and electrical sheets and other steel products was seriously accentuated by the steel strike and this situation likely will become more critical should the coal strike continue over 2 to 3 weeks. New demand continues to exceed output of sheets and strip. Mills are booked through 1946 on galvanized and electrical sheets, with light gages of plain hot and cold-rolled extended well into fourth quarter. Problem of satisfying needs of regular customers is accentuated by resumption of operations of such large consumers as General Motors Corp. and General Electric Corp., while many metalworking companies have reopened their plants in recent weeks.

Report is current that galvannealed sheets take the straight $7 a ton price advance instead of the 8.2 per cent increase (base price plus extras) as originally indicated. Carnegie-Illinois Steel Corp. and National Tube Co. fell in line with other steel producers in announcing a price advance, effective April 2, of 8.2 per cent on its stainless steel products. Most interests are out of the market on shipment of polished stainless steel sheets for this year; other items are available for late third and fourth quarter delivery.

Chicago — Demand for steel sheets of all types continues in tremendous volume and mills assert that many consumers have little appreciation of the overall situation. Known requirements for sheets suggest that little improvement can be expected this year and possibly in 1947. Some makers are booking ahead on a tentative basis but others de-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cline to accept tonnage beyond mid-year. There is a possibility in the meantime that demand for consumer goods in the year ahead will not be as heavy as predicted, due to strikes and other uncertainties, thus the situation may tend partly to remedy itself.

Steel Bars . . .

Bar Prices, Page 154

Already far behind in delivery of steel bars, producers face a probable further delay from curtailment of production during the soft coal strike. Most mills are sold through the year on small sizes while tonnage of larger bars available in fourth quarter is small. Hot-rolled alloy bars are easy, with deliveries in May and June in some cases, but the situation is tightening.

New York — While fearing that the coal strike will upset schedules again, hot bar sellers nevertheless are quoting at present on the basis of normal operations, at least those who are not sold out for the entire year on all sizes, in which latter case they are not quoting at all as they have not as yet opened their books for 1947.

Broadly, little small sized hot bar tonnage is available for this year; medium and large bars can be had in fourth quarter, although in steadily shrinking amount. Cold-drawn bar deliveries range late in third quarter and early fourth quarter on medium and large rounds and late in fourth quarter on small rounds. Hot alloy bars are available in May and June, although compared with a month or so ago deliveries are tightening. Inquiry for small bars is the heaviest on record, in the opinion of some producers.

Boston — With hot-rolled carbon bars virtually sold through this year, notably small sizes, ⅝-inch and under, deliveries on cold-drawn in the same ranges are becoming steadily more extended. Cold-drawn alloys in smaller diameters are also in fourth quarter with some producers; ground alloy stock up to ⅝-inch is in the same extended position. Normal spread between hot-rolled and treated alloy bars is out of balance, but less so as size range increases. Demand for alloys compared with carbon bars is inclined to lag; pressure for small bessemer screw stock is maintained. On the whole, demand is centered so heavily in sizes on which deliveries are most extended, some consumers are confronted with shortages later unless room is found for tonnage on schedules yet to be determined for third and fourth quarter. To fill these schedules enough volume in smaller sizes has already been booked.

Pittsburgh — Carbon and alloy bar production schedules of leading producer here were adversely affected last week as result of the coal strike. Carryover tonnage on mill books is heaviest on record. Narrow profit margins on hot-rolled bars are forcing some interests to stop shipping into areas requiring heavy freight absorption, and to restrict output of some bar sizes. Steel tonnage thus involved has been converted into more profitable cold-finished items.

Curtailment in merchant carbon bar output will be reflected shortly in a corresponding reduction in cold-finishers' production schedules. Most cold drawers resumed operations soon after the wage-price issue was settled among basic steel producers. However, it took 10 days to 2 weeks before carbon bar production reached prestrike pace, with result inventories of cold-drawers have been sharply reduced. Delivery schedules extend into fourth quarter on ⅝-inch and smaller, bessemer steels and round shafting.

Buffalo — A leading bar producer here has placed two of its three bar mills on a seven-day schedule in an effort to check further extension in delivery. Small bars are booked into fourth quarter. Structural fabricators press for delivery in view of possibility of further construction regulations.

St. Louis — Pressure for carbon bars is strong, with slightly increased production gaining on orders. Schedules are filled through first quarter next year and no more orders are being accepted. Peak demand is predicted in June or July, when it is believed strikes will have subsided and consumer goods manufacturers will find better supply of sheets, strip and similar items needed in conjunction with bars. Barmakers this week received the government order banning new industrial construction. They predict some order cancellations or holdups but not enough to improve delivery schedules. Mills here have built up a 6 to 8 weeks' stockpile of fuel in anticipation of the coal strike.

Cleveland — Bar tonnage carryover

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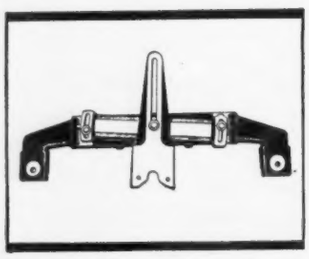

Model 710 Master Taper Attachment

AA-63

from first quarter was the heaviest in history, due to the steelworkers strike. Strike of coal miners has forced curtailment of production at many mills and will reduce operations further in direct proportion to its length. Some 8 and 10-inch mills are filled to capacity into first quarter of 1947 while larger mills have little open space through the end of this year. Some mills which are selling on a quarterly basis have filled their second quarter books fully.

Philadelphia — Producers of hot-rolled carbon bars are generally sold out for this year on small rounds, if not formally, at least informally on a quota basis. Only on certain larger sizes are they able to offer much before the closing weeks of the year. One large mill is quoting September and October on flats 3½ inches and over and November and December on rounds 1½ inches and over. Hot alloy schedules are expanding, with one producer now offering late June and July.

Tin Plate . . .

Tin Plate Prices, Page 155

Pittsburgh — How soon tin plate output will be affected by curtailment of primary steel output due to the coal strike is not yet officially indicated. Some interests state tin plate production schedules will be favored as long as consistent with steel supply. It is indicated that tin plate output over the next few months will be concentrated in those specifications covering food pack requirements. Industry operations had recently attained the pace recorded just prior to the steel strike. Loss in output due to that strike represented nearly eight weeks' production, which if superimposed on threatened further reduction in output due to coal strike, would make it impossible for the industry to meet all of essential container requirements during the early summer. There is good prospect that the 152,000 tons of the original 215,500 tons scheduled for export during first half may be pushed ahead until late this year to help producers meet critical domestic food pack requirements.

Steel Plates . . .

Plate Prices, Page 155

Demand for steel plates continues to grow and deliveries promised on current business now extend into fourth quarter, though others still are able to do better.

Philadelphia — Plate order backlogs continue to increase. Most sellers are quoting fourth quarter and one large producer who only a week ago was promising shipment late in August is now offering late September and early October. One eastern Pennsylvania producer who only recently resumed operations after being down since the beginning of the steel strike is quoting fourth quarter delivery, except possibly on universal plate. This producer is quoting prices on an adjustable basis, pending final action on an appeal for further price relief.

Boston — Uneven distribution as to sizes in backlogs is apparent in plates as in other steel products, with delivery schedules varying; in heavier gages some mills can ship in third quarter or October, but in lighter sizes, notably ⅜-inch, capacity is filled beyond. Demand in this area runs mainly to light welding quality stock; except for weldments inquiry for heavier material is slow and total inquiry has slackened some. While tank requirements are mainly for smaller units, a standpipe at Groton, Conn., and an elevated water tank at Wenhan, Mass., are being estimated, about 200 tons.

Birmingham—Award of 11 cargo vessels for the French government to be constructed by the Tampa Shipbuilding Co. Inc., Tampa, Fla., has been approved by the Maritime Commission. Included are five 323 feet long of 3805 gross tons and six motor ships, 346 feet long, 3500 gross tons; delivery is for the first five months in 1947.

Seattle—Reclamation Bureau, Denver, has asked bids May 1 for three welded steel water storage tanks with 510,000 gallons capacity for Grand Coulee dam, specification 1266, and May 6 for five 72-inch valves, controls and other items for Anderson Ranch dam, Boise, Idaho.

Tubular Goods . . .

Tubular Goods Prices, Page 155

Boston — Distribution of about 9000 tons of surplus steel pipe, bid at the Davisville, R. I., depot, holds attention

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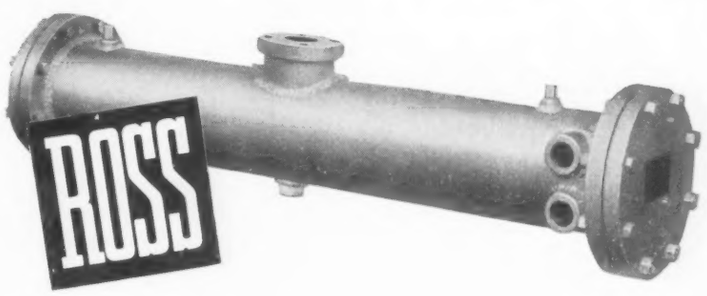

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in the East. Pipe mills have been making some progress in gaining ground lost, six weeks in some cases, although November is best delivery on butt and lap-weld in general on new orders; seamless in October and boiler tubes late third quarter. Demand for pipe and tubing is active. Tightness in strip is reflected in welded tubing. Inquiry for sprinkler requirements is also brisk; fire protection systems for some war time plants are just now being installed. Textile equipment builders and other industrial users of tubing are also buying. For heating at the General Motors plant, Framingham, Mass., 150 tons of steel pipe will be furnished by Jones & Laughlin Steel Corp.

Two inquiries for 138,250 feet, welded or seamless pipe, revives buying at the Springfield, Mass., arsenal, bids closing April 3 on 94,150 feet and April 19 on 44,100 feet of one-inch.

Seattle — Cast iron pipe sellers find active interest in pipe but deliveries are delayed and indefinite, with local inventories practically exhausted. Potential market is of large proportions and heavy tonnages will be placed as soon as deliveries become definite. The largest pending project is at Hillsboro, Oreg., where bids will be opened April 11 for the first phase of a $710,000 project requiring several thousand tons of pipe, much of 18-inch. Alternates are asked for steel and iron.

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Rails, Cars . . .

Track Material Prices, Page 155

New York — Domestic freight car awards in March comprised 300 units, the smallest total since June, 1943, when 50 cars were placed. Two hundred and fifty of last month's total have just recently been announced and include 200 phosphate cars for the Seaboard Airline, placed with the Pullman Standard Car Mfg. Co., Chicago, and 50 caboose cars for the Chesapeake & Ohio, with the American Car & Foundry Co., New York. Comparisons follow:

	1946	1945	1944	1943
Jan.	420	7,200	1,020	8,365
Feb.	1,795	1,750	13,240	350
March	300	2,500	6,510	1,935
April		1,120	4,519	1,000
May		1,526	1,952	870
June		670	1,150	50
July		3,500	795	4,190
Aug.		7,240	3,900	8,747
Sept.		12,840	400	6,820
Oct.		1,320	2,425	5,258
Nov.		1,650	1,065	870
Dec.		4,116	16,245	2,919
Total		45,432	53,221	41,355

Wire . . .

Wire Prices, Page 155

Boston — The automotive industry seeks to place additional tonnage and presses for delivery of delayed shipments, notably high-carbon, including spring wire. Producers of bead wire seek to make up six to eight weeks lost last quarter, with demand for that grade heavy. Music wire is somewhat more active but on some sizes there are openings for late third quarter. Spring wire is extended into fourth quarter, both mechanical and furniture, with the latter notably tight. Considerable rescheduling of orders continues and drawn wire programs can not be fixed far ahead because of uncertain rod supply. Continued limited rod supply makes for selectivity in production and output of basic is sharply reduced in spots. Demand for wire rope has turned upward.

New York—Nail shortage in building sizes is acute with distributors. Sellers are rationing and there are reports of black market operations in this product. With the average dwelling house taking five kegs, the projected housing program of 2,700,000 units in the next two years would require about 12,500,000 kegs. To fill this requirement production of nails will have to be increased substantially. Nails are a low profit item with most producers and need for wire in more profitable products is a retarding factor. Pressure for drawn wire is heavy, reflecting wide gaps in consumer inventories. Deliveries based on quotas are several weeks behind schedule.

Birmingham—With wire mills operating at capacity, production still is falling far short of customer requirements. Demand from farmers for wire and nails is heavy and there is no indication of immediate balancing of supply and demand.

Pittsburgh—Unprofitable margin provided under price ceilings has forced some intergrated mills to convert most of their wire rod output into specialty items that bring a better return. Supply of wire rods and some finished wire products has been well below require-

ments for many months, due in part to unprofitable production of these items and because of the production loss from the steel strike. Unless additional price adjustments are granted, producers' output of wire rods, some merchant wire items, including nails and bright basic wire, will remain restricted. Sellers also are limiting new business to those areas involving a minimum of freight absorption. In contrast with above items, output of lawn and farm fence is slated for an increase because of its more favorable profit margin.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 155

Pittsburgh — Ceiling price increase of 7 per cent on bolts, nuts, screws and rivets allowed by OPA, effective April 1, is wholly inadequate, according to producers, the advance representing less than half that requested. One interest here points out that wages alone have advanced 18.5 per cent since prices were frozen in October, 1941.

Output of fasteners has been well below demand for months, a condition that was accentuated due to the production loss sustained by some interests during the steel strike. Industry order backlogs are extended into fourth quarter in most instances.

New York — The 7 per cent increase on bolts and nuts and other standard fastenings granted by the Office of Price Administration, effective Apr. 1, and not retroactive, is generally disappointing to makers. Some estimate 5 per cent of the increase would just about cover the latest increase in steel prices, leaving them only 2 per cent to meet increases in wages, packing costs, and other factors.

Inquiry continues heavy, especially for small bolts for assembly of parts for automotive and household appliances. Wholesale hardware companies are fairly deluging makers with orders and considerable tonnage is coming out from prefabricators of houses, it is said. Export demand is heavy, and a good tonnage is moving to the Philippines, the Near East and Africa, especially to points that are likely to continue to provide good outlets for American bolts and nuts after the present emergency abroad is over.

Some sellers are able to make deliveries in 8 to 12 weeks, depending upon specifications; others do not appear able to do that well.

Structural Shapes . . .

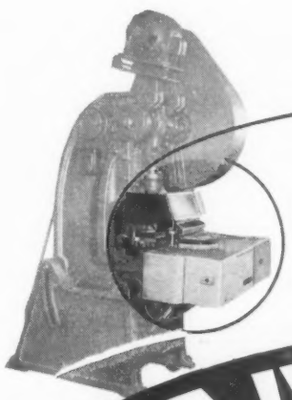
Structural Shape Prices, Page 155

Boston — Interruptions in preparing plans by a strike of drafting room employes of Stone & Webstetr Engineering Corp., Boston, is delaying work already in progress and will hold back additional tonnage. This firm has contracts requiring an estimated 100,000 tons of fabricated steel through this year. A good part has been placed but a large tonnage remains to be awarded. This, coupled with confusion as to application of controls limiting new construction, has dampened inquiry and high costs also hold up some work.

Pittsburgh — Need for prompt clarification and interpretation of the new construction regulations, restricting many industrial and commercial expansions, is indicated by the numerous questions posed CPA officials and steel producers regarding status of work partially under way or still in the planning stage.

Trade interests expect industrial and commercial construction to decline sharply soon after projects now under way are completed, resulting in wide unemployment. Many expansion programs now in the inquiry stage will be held up indefinitely. Present mill order backlogs are in for some extensive revisions. However, most fabricators have substantial volume of orders for construction already started, a considerable proportion of which is well behind schedule In addition a large number of heavy construction projects, such as bridges and hospitals are not affected by the order, and some interests are hopeful that local CPA offices will approve a fairly large number of industrial programs held essential to speed output of civilian goods.

Chicago — Structural fabricators as well as shape producers doubt that the order curtailing industrial and commercial construction will have much effect on their operations for months. Lack of steel already has fabricators in a tight spot and they feel that sufficient construction will be given approval to assure reasonable operations over balance of the year. As for the shape producers,



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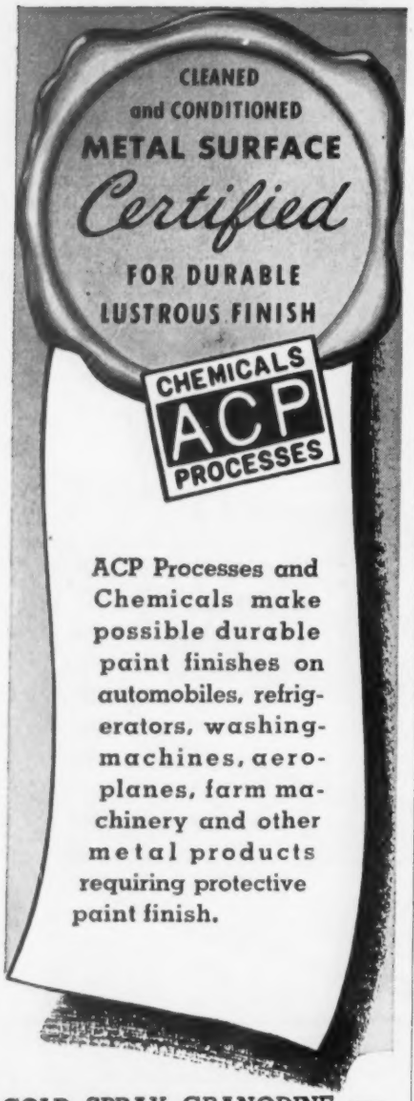

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any easing in demand over the next few months will come as relief. Only a portion of shapes go into building construction, heavy machinery, railroad cars and bridges being large outlets. Inquiries for fabricated steel are light and awards are in about the same volume as recent weeks.

Buffalo—Leading contractors, with sufficient work under way to keep busy through this year, doubt if CPA regulations will have much effect on construction. They claim that materials and some labor used in industrial and commercial projects would not be suited to home building. Activity continues brisk, with numerous small jobs coming out.

Philadelphia — Outlook in structural steel is clouded by the effort to divert steel from industrial building to housing. However, there still is brisk demand for shapes from jobbers, whose stocks are almost nothing, and from manufacturers of a wide diversity of products. This will mean more light type tonnage, not as profitable to mills. There likely will be considerabe heavy work in addition to that already scheduled and sure to go ahead. Many projects, particularly of an industrial character, which will mean creation of new jobs, will win final approval, in the firm opinion of some structural leaders. They regard this as especially likely in the case of heavy mill-type structures where major requirements are steel in no way critical to the housing program and where operating equipment means work for many thousands in its construction.

Undoubtedly many applications will not gain approval and while plans are being revised to permit substitutions there will be delay. General disposition of many trade leaders is more hopeful than at first. Steel items critical to the housing program include principally sheets for heating, ventilating and roofing, pipe and nails and to some extent reinforcing bars. Likely also to increase backlogs of shape mills are heavy export requirements, including heavy as well as light sections.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 155

Pittsburgh—New construction regulations are expected to be keenly felt by reinforcing bar contractors. Many industrial and commercial expansion programs scheduled to commence this spring now must be held up until processed through regional CPA offices. Of immediate concern to contractors is status of projects not yet actually started although much preparatory work had been done, including receipt of substantial reinforcing bar tonnages. In some respects producers are not sorry that overall bar requirements the remainder of this year will be drastically reduced, for production has represented only a small proportion of total demand each month since V-J Day, necessitating much diplomatic handling of customers through voluntary rationing of restricted output.

Seattle—Rolling mills are operating at as high a rate as conditions will permit. Demand for reinforcing steel is strong and bookings are large, mainly in small lots, under 100 tons. Larger projects are being postponed because of government regulations on building.

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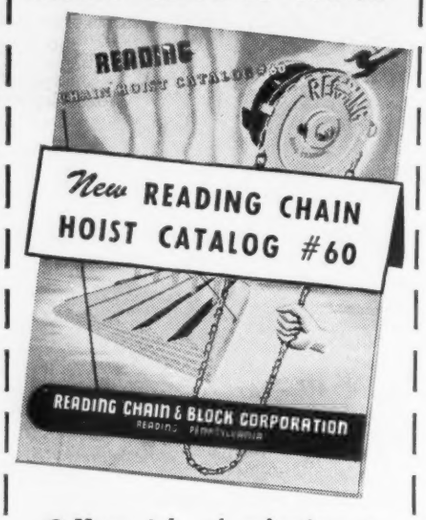

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Several major jobs are up for action soon, including 4000 to 5000 tons for the Coulee Columbia Basin irrigation project and piers for the Navy at Puget Sound Navy Yard and Tongue Point, Oreg. The Navy has called bids for April 19 for eight reinforced concrete piers at latter station. Washington state announces about 512 miles of roads will be under construction or reconditioning this year, requiring much reinforcing steel.

Chicago — Reinforcing steel interests do not yet know the full import of the construction curtailment order. For the time being, they are so far behind in fulfilling their obligations that halting of industrial and commercial construction will operate as a breathing spell. Momentary worry is that if steel mills begin curtailing operations this week, receipts from mills will suffer and further delay jobs under construction. Inquiry for bars is light, but awards last week were the largest in some time, virtually all business figured some time ago.

Pig Iron . . .

Pig Iron Prices, Page 157

Effects of the coal strike appeared promptly in the pig iron market, blast furnace curtailment being forced by lack of coke. Prolonged cessation of mining will bring closing of many foundries within a short time as pig iron supply will be cut deeply.

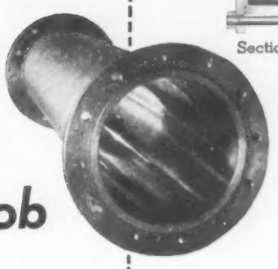
Pittsburgh—Coal strike forced sharp curtailment in pig iron output last week, with the largest producer banking 20 out of its 32 active blast furnaces in this district, thereby reducing operations to 38 per cent. If a complete shutdown occurs before the coal strike is terminated, it is estimated that a full month would be required for this producer to restore full operations when coal supplies become available. Other steel plants did not immediately start curtailing pig production last week, but soon will be forced to if coal strike continues. Lone merchant iron producer here has sufficient fuel to maintain present output pace for about three weeks.

Merchant pig iron supply outlook has been growing more critical in recent months, due to the steel strike and steady expansion in requirements from key reconversion industries. Present coal strike is accentuating this situation and unless soon terminated it is probable that many foundries will have to close. Until now blast furnace interests have been able to keep all foundries here in sufficient iron supply to sustain expanding operations.

Buffalo — While no curtailment in pig iron output or foundry melt was reported during the first week of the coal strike a sharp reduction is expected this week, if the strike continues. The expected cut in production comes as pressure is strong for iron for production of pipe, radiators, furnaces, valves and hardware. Urgent demand also is reported for railroad castings. Several suspensions of shipment to midstate foundries are reported because of violation of the 30-day inventory regulation. Still closed by strikes are Worthington Pump & Machinery Co., two Lake Erie Engineering plants and three American Radiator plants here. New York Car Wheel Co. has signed a new contract

built

to stay on the job



Sectional View

Honed bore of a 16 inch, 7 ft. cylinder

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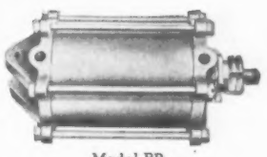
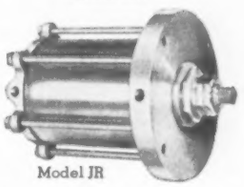


Model BR



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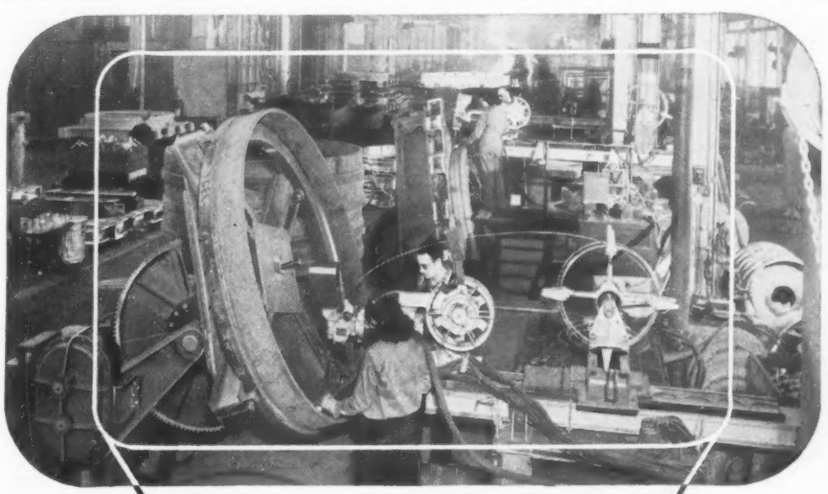

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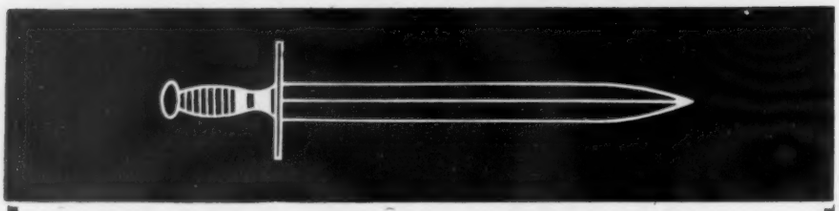

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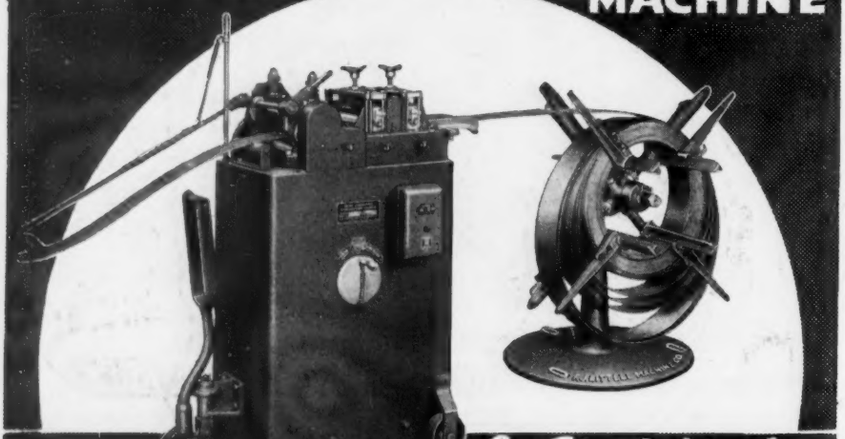

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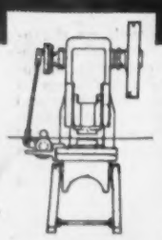

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St. Louis—Pig iron supply remains tight, although relieved a trifle by a strike shutdown of one rolling mill which takes about one third of the pig iron output here. Tonnage has been restricted since the war by idleness of a government-owned furnace, leaving production at 50 per cent of capacity. Production has been unchanged for several weeks.

Birmingham—The merchant pig iron situation here is growing tighter as increased demands are made by soil pipe manufacturers, foundries, stove plants, pressure and water pipe manufacturers. For every ton produced, there are four or more customers to be satisfied.

Boston—Not until iron ore is available by water at lower cost will Mystic blast furnace resume operations. Production will not be started with Lake Superior ore and with stocks of iron depleted this furnace will not be competitive until ore can be obtained at lower cost. Melt ordinarily would be rising, with several foundry and steelworks strikes terminated, but the increase is being retarded by limited iron supply. While there are fewer emergency shipments both Buffalo and eastern Pennsylvania furnaces are shipping all iron that can be spared, with rationing prevalent. To maintain operations at a higher rate by the district cast pipe foundry more will be required from an eastern Pensylvania steelworks furnace.

New York—Most district consumers of pig iron believe they will be able to operate near their present levels throughout the month, even should the soft coal strike be prolonged. They figure that blast furnaces supplying this district will not be forced down immediately because of lack of coal and that what they are able to ship meanwhile, with what foundries have on hand, will last them through April.

The New York state barge canal opens its season Apr. 15, but there appears little likehood of any water movement of iron to this district for some time, because of the time involved. In other words, neither consumers nor producers have much on hand, and the lag, compared with rail shipment, would be too great for satisfactory operation.

Cleveland—Blast furnace operations in this district were not affected materially last week, although blast was reduced in two stacks. Repairs on one blast furnace operated by Jones & Laughlin Steel Corp. will be completed this week but no decision on placing it in operation will be reached until the coal situation is clear. Only about one-third of first quarter's scheduled production was attained, due to the steel strike, precluding replenishment of consumers' stocks. Foundries have been informed what tonnage they have been allotted for second quarter, subject to reductions if the coal strike is prolonged. Since consumers' stocks of pig iron are under the 30-day limit and in some cases are equal to less than a week's requirements, their operations will be affected almost immediately when blast furnaces are banked.

Philadelphia — District blast furnace production is expected to be curtailed this week, assuming the coal strike continues. At least one producer with two stacks is expected to bank the smaller unit and others are expected to start

curtailing. This will be followed soon by further steel ingot shrinkage, a drop of a few points having already been made, and may affect some foundry production soon, although it appears that most foundries will be able to maintain their melt through most of this month in any case.

Cincinnati — The immediate outlook for foundries is uncertain, few having even 30-day supply of pig iron. Melters have not yet curtailed, awaiting definite word as to what pig iron tonnage they may expect in the near future.

Chicago — Each week sees foundries in tighter position concerning inventories of pig iron and coke. Up to the moment in this area, melts have not suffered for lack of these materials but it can happen soon. Hand-to-mouth supply has worked only because transportation has been good. Beginning this week, the situation may change for the worse because coke ovens and blast furnaces will begin reducing operations. Last week, CPA reduced allowable coke inventories to 20 days. Of the district's 41 blast furnaces, 34 are operating, but bankings are scheduled to start this week.

Scrap . . .

Scrap Prices, Page 158

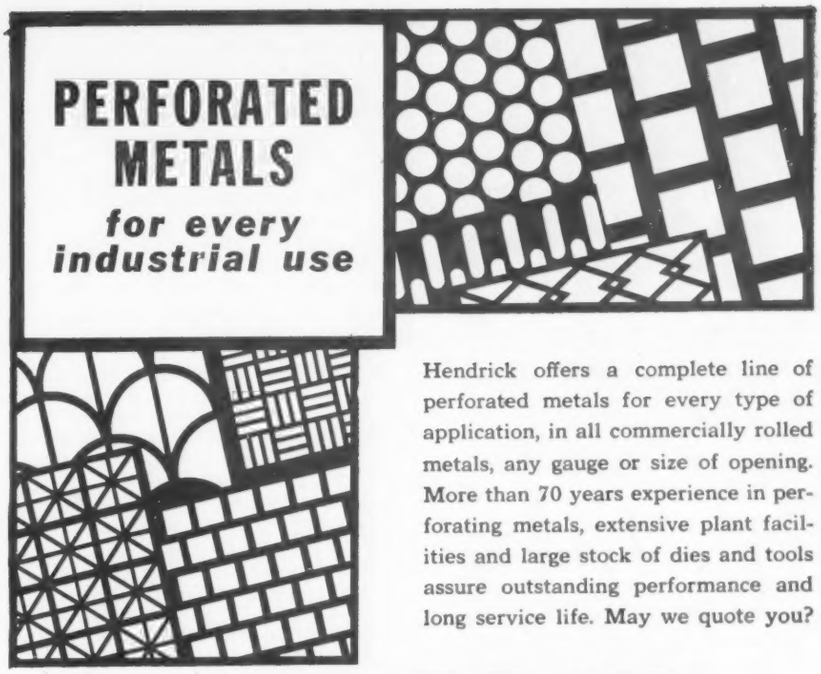
Scrap continues exceedingly scarce and consumers are taking all available tonnages, paying high springboards and extra freight to obtain tonnage. Reduction of blast furnace and steelworks operation because of the coal strike will allow some accumulation of scrap, though this is not expected to ease the situation much.

Chicago — With district steel mills operating at near full capacity, 92 per cent, the highest since early last December, demand for scrap is stronger than ever. Because of the coal strike, steelmaking operations are expected to undergo curtailment this week, but this probably will not affect pressure for scrap. Consumers will want to acquire all the material they can to bolster inventories in anticipation of good production of steel after coal mining resumes. Scrap is still scarce and prices hold firmly at ceiling. Production scrap, while improving gradually, is still lower than prior to the steel strike.

Pittsburgh — Steel producers are taking all good quality scrap offered despite indicated sharp reduction in production schedules just ahead, for mill scrap inventories are well below normal. Consumers are paying springboards up to $2.50 per ton on heavy melting steel, $1.50 on carbon machine shop turnings and $5.50 on cast scrap, indicating keen interest in the limited scrap available.

Boston—Buying and shipments are limited only by supply, notably for No. 1 heavy melting steel and cast. Volume of unprepared material to yards is not heavy and improvement in industrial scrap, although slight, is still below expectations. Prices are at ceilings and ready market is found for low phos at the premium. Yards are keen for low phos and mill inspections on that grade are tightening. Considerable contract terminated material remains to be liquidated, some of which will go as scrap. A large offering is developing for sale at the Bethlehem-Hingham shipyard.

Buffalo—Mills may have opportunity



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to increase scrap inventories during the coal strike if consumption is curtailed by a long strike. Receipts have fallen to a low point, making it difficult to accept orders. Receipts by lake from upper lake ports are expected to be much less than last year, accumulations being smaller. Labor costs are a large factor, in some instances wages being double prewar level.

St. Louis—Scrap shipments are up somewhat, due to better weather. Collections at remote points are still hampered by manpower shortage and seasonal improvement is below normal. Premium grades of scrap are scarce and demand heavy. Production of industrial scrap remains low, but there is some promise of an increase providing the coal strike is short. Brokers are accepting few new orders. With the exception of one mill shut down by a strike, melters are taking all the scrap they can get. Reserves are 30 to 45 days. Prices remain at ceilings.

Philadelphia — All grades of steel and cast scrap continue in brisk demand with supply of cast far short of requirements. Possibility of substantial curtailment of steel ingot production as a result of the coal strike has not yet caused slackening of interest and it is doubtful if it will for a while as consumers may take the opportunity of building up meager reserves, even if forced to reduce their melt.

Cincinnati — Demand for iron and steel scrap is unsatisfied, with tonnage far below last fall. Greatest factor in light offerings is shrinkage in industrial scrap. Scarcity of cast scrap is acute; in some instances truck shipments were made to maintain operations. Requirements of cast are such that one melter showed willingness to bring in remote tonnage a record distance.

New York—Brokers are being pressed on all sides for material with Pittsburgh, eastern Pennsylvania and Sparrows Point consumers active. Regardless of the coal strike heavy melting steel buyers are specifying as freely as ever, apparently with the intention of building up stocks, even though steel production may be halted. Opening of the New York state barge canal now is scheduled for Apr. 15 instead of Apr. 1 as originally announced. This is likely to result in some movement of scrap by water into the Buffalo area.

Warehouse . . .

Warehouse Prices, Page 156

New York—While steel deliveries to warehouse have been improving, inventories of wanted sizes and gages in numerous carbon products are so depleted stocks are still out of balance, limiting total sales and still reflecting tonnage lost by the steel strike. Demand for alloys tends to lag and inventories with most distributors are in fair balance; confusion as to placing alloys, including stainless has about cleared. With warehouse allocations of galvanized sheets sharply reduced, distributors in some cases are limiting buyers to 300 pounds per order and at times are unable to supply even that quantity.

Boston — Demand for steel from warehouse continues heavy, but volume is limited by unbalanced invenetories, notably in light gages of sheets in practically all grades, strip and carbon bars under ⅜-inch. Shapes are also moving well, as are light gage plates. In flat-rolled products distributors are experiencing the effect of reductions in quotas, in galvanized especially. Steel from mills has been in slightly heavier volume, but not in sizes sufficient to fill gaps in stocks. Bolts, nuts and alloys are in best balance as a rule with most distributors.

Stainless Steel Prices Advanced 8.2 Per Cent

American Steel & Wire Co., Carnegie-Illinois Steel Corp. and National Tube Co., all United States Steel Corp. subsidiaries, announce that effective on all shipments on and after Apr. 2 base prices and extras for stainless steel products will be increased 8.2 per cent. Republic Steel Corp. has made a similar announcement, the increase being effective March 29.

Slowdown of Metalworking Results from Coal Strike

(*Concluded from Page* 62)

tonnage because of the walkout at the bituminous mines, it can be ill afforded, industry spokesemen say. Never in peacetime have requirements for steel been as heavy, nor as a basic commodity has its production been more badly needed in helping to combat inflationary trends, they point out. In all major lines of steel, deliveries are becoming more stringent, and an increasing number of producers are out of the market entirely, having committed themselves on all tonnage to be produced this year and having refused to open their books for next year's business.

In view of this critical situation, industry representatives were at a loss to explain the near-apathy with which the coal strike apparently was being regarded in many quarters. While mine operators and miners continued in their stalemate, the administration took no action other than assigning a Labor Department conciliator to the case.

Crucible Sells LaBelle Works to Scrap Firm

Crucible Steel Co. of America, New York, has sold its LaBelle plant in Pittsburgh to M. N. Landay Co., Pittsburgh; selling price not disclosed. The plant (about which the novel "Valley of Decision" centered) is in the process of being dismantled for scrap, all usable equipment having been transferred to the company's Midland Works. Annual production capacity at LaBelle plant Jan. 1 last was rated as follows: Ingots, 3780 net tons, sheared plates, 15,600; tool steel bars, 31,800; and forgings, 2400 net tons. The plant employed about 1000 persons. Many of the em-

ployes have been transferred to other plants of the company.

Crucible company is spending nearly $6 million at its Midland Works, Pittsburgh, including purchase of a 6-stand 24-inch billet and bar mill for $2.5 million, to be constructed by United Engineering & Foundry Co., Pittsburgh. Revamping of the company's 8, 12 and 14-inch mills is also under way; and similar improvement in facilities is contemplated at the company's Park Works, Pittsburgh.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3175 tons, sheet and bearing piling and accessories, Keweenaw waterway revetment, Houghton, Mich., for U. S. Engineer, Duluth, to Carnegie-Illinois Steel Corp., Chicago; bids March 22.

1100 tons, molding plant, Hammond, Ind., to American Bridge Co., Pittsburgh, from Fred C. Rowley & Sons.

950 tons, molding plant, Hammond, Ind., for Keyes Fibre Co., to American Bridge Co., Pittsburgh.

800 tons, bus garage, New York, to American Bridge Co., Pittsburgh, from Wilcox Construction Co.

750 tons, various buildings, Texas City, Tex., for Carbide & Carbon Chemical Corp., to Mosher Steel Co., Houston, Tex.

533 tons, six bridges, various locations in Oklahoma, for St. Louis-San Francisco railroad, to Virginia Bridge Co., Roanoke, Va.

515 tons, laboratory and office building, Calco Chemical Co., Bound Brook, N. J., to Savary & Glaeser Inc., Dunellen, N. J.

500 tons, crane girders, Fairfield, Ala., to American Bridge Co., Pittsburgh, from Virginia Bridge Co., Roanoke, Va.

450 tons, store expansion, L. L. Berger Inc., Buffalo, to Buffalo Structural Steel Co.; Berrick & Wright, Buffalo, contractors.

410 tons, Virginia state bridge over Tye river, to Virginia Bridge Co., Roanoke, Va.

400 tons, warehouse, Camden, N. J., to American Bridge Co., Pittsburgh, from Austin Co., Cleveland .

400 tons, store, Hopkins, Minn., for Red Owl Stores Inc., to Minneapolis-Moline Power Implement Co., Minneapolis; Standard Construction Co. Inc., Minneapolis, contractor; bids March 11.

300 tons, vinyl resin and pilot, building, Richmond, Ind., to American Bridge Co., Pittsburgh, from Blaw-Knox Co., Blawnox, Pa.

300 tons, coal trestle, Philadelphia, to American Bridge Co., Pittsburgh, from Reading Co.

300 tons, expansion, Cement City, Mich., for Consolidated Cement Co., to Mississippi Valley Structural Steel Co., Decatur, Ill.

275 tons, Navy development at White Oak, Md., to Reliance Steel Products Co., McKeesport, Pa.; approximately 500 tons for this project abandoned.

260 tons, repair shop, White Motor Co., New York, to Belmont Iron Works, Eddystone, Pa.

200 tons, press building, Trenton, N. J., to American Bridge Co., Pittsburgh, from Eastern Construction Co.

200 tons, factory building, Carlstadt, N. J., to Bergen Point Iron Works, Bayonne, N. J.

180 tons, Virginia state bridge over Nottoway river, to Virginia Bridge Co., Roanoke, Va.

135 tons, manufacturing building, Chicago, for Poster Pharmacy Building Corp. to Hansell-

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Elcock Co., Chicago; Robert Black Co., Chicago, contractor.

105 tons, railroad bridge, Sheboygan, Wis., for Chicago & North Western railroad, to American Bridge Co., Pittsburgh; bids March 11.

100 tons, addition to boiler house (building No. 50), Laporte, Ind., for Allis-Chalmers Mfg. Co., to Mississippi Valley Structural Steel Co., Decatur, Ill.; bids March 5.

100 tons, bridge, Marinette county, Wis., for State Highway Commission, to Worden-Allen Co., Milwaukee; R. B. Vickery, contractor; bids March 22.

100 tons, Link-Belt Co. plant, Seattle, to Isaacson Iron Works, Seattle.

100 tons, construction project at Billings, Mont., to Issacson Iron Works, Seattle.

STRUCTURAL STEEL PENDING

4650 tons, engine shop and engineering building, Pontiac, Mich., for Truck & Coach Division, General Motors Corp.

1700 tons, land approach on Brooklyn side to the Battery-Brooklyn tunnel; general contractors bids closed April 2.

1500 tons, fiber board mill at Macon, Ga., for Armstrong Corp. Co., Lancaster, Pa.

1500 tons, construction trestle, Ft. Gibson dam, Okla., for United Construction Co.; bids April 1.

1200 tons, three drum gates, Shasta dam, Coram, Calif., for U. S. Bureau of Reclamation; bids April 24.

905 tons, TPG highway bridge F 469(3), Rochester, Iowa, for State Highway Commission; bids April 2.

865 tons, General Electric Co., plastic plant, Wallingford, Conn.; bids asked.

750 tons, factory building, Cartersville, Ga.; bids asked.

500 tons, sheet piling, lock and guide wall extension, dam No. 21, Quincy, Ill., for U. S. engineer; bids April 12.

450 tons, pipe racks, Texas City, Tex., for Carbide & Carbon Chemical Corp.

400 tons, sheet piling, lock and guide wall extension, dam No. 11, Dubuque, Iowa, for U. S. Engineer; bids April 16.

300 tons, Dreamland Roller Skating Rink, Philadelphia, Frank Grad & Son, Newark, N. J., architects.

300 tons, penstock coaster gates, Shasta dam, Coram, Calif., for U. S. Bureau of Reclamation; bids April 9.

230 tons, Maryland state bridge, North Branch of Patapsco river; Thomas Bennet & Hunter, Westminster, Md., low on general contract.

210 tons, furnace building, Victor, Fla., for Stone & Webster Engineering Corp.

200 tons, 150 tons in beam span, bridge R-208, Lawler, Iowa, and 50 tons in repairs to bridge A-316½, Milwaukee, for Chicago, Milwaukee & St. Paul & Pacific railroad.

175 tons, sheet piling, dam, Algonquin, Ill., for State Division of Waterways; bids April 4.

150 tons, plant addition for Atlas Powder Co., Atlas Point, Del.

142 tons, bridge, Monroe county, Wis., for State Highway Commission; P. W. Ryan Sons, contractor; bids March 22.

Unstated, gantry crane for Grand Coulee dam; Washington Iron Works, Seattle, low at $52,095.

Unstated, warehouse for Reclamation Bureau at Hungry Horse dam, Montana; bids to Denver, April 15, Spec. 1249.

Unstated, three-story addition to Frederick & Nelson department store, Seattle; bids April 28.

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REINFORCING BARS . . .

REINFORCED BARS PLACED

750 tons, addition, Miller Brewing Co., Milwaukee, to W. H. Kipkorn Co., Milwaukee; Selzer-Ornst Co., Milwaukee, contractor.

750 tons, cheese factory, Plymouth, Wis., for Borden Co., to Ceco Steel Products Corp., Cicero, Ill.; W. W. Oeffein Inc., Milwaukee, contractor.

600 tons, race track grandstand, Lincoln, R. I., to Joseph T. Ryerson & Son Inc., Cambridge, Mass.; E. Turgeon, Providence, general contractor.

550 tons, tanks, Toledo, for Libbey-Owens-Ford Glass Co., to Carnegie-Illinois Steel Corp., Chicago.

350 tons, water reservoir, Ottumwa, Iowa, for city, to Ottumwa Bridge & Construction Co., Ottumwa, Iowa; Arthur H. Neumann & Bros. Inc., Des Moines, contractor; bids March 16.

300 tons, bottling plant, Minneapolis, for Coca Cola Co., to Cowin & Co. Inc., Minneapolis; Standard Construction Co., Minneapolis, contractor.

250 tons, parking station, Milwaukee, for Gimbel Bros., Milwaukee, to W. H. Pipkorn Co., Milwaukee; Selzer-Ornst Co., Milwaukee, contractor.

200 tons, substructure for warehouse, Chicago, for Goldblatt Bros. Inc., to Joseph T. Ryerson & Son Inc., Chicago; John Griffith & Son Construction Co., Chicago, contractor.

150 tons, metallurgical building, Chicago, for Illinois Institute of Technology, to Joseph T. Ryerson & Son Inc., Chicago; Dahl-Stedman Co., Chicago, contractor.

150 tons, office building superstructure, Springfield, Ill., for Franklin Life Insurance Co., to Ceco Steel Products Corp., Cicero, Ill.; Evans Construction Co., Springfield, Ill., contractor.

130 tons, addition, Chicago, for Ravenswood hospital, to Ceco Steel Products Corp., Cicero, Ill.; H. B. Barnard, Chicago, contractor.

100 tons, department store, Elgin, Ill., for Joseph Spiess Co., to Bethlehem Steel Co., Bethlehem, Pa.; Charles E. Giertz & Son, Elgin, Ill., contractor.

REINFORCING BARS PENDING

6500 tons, sewage plant, Chicago, for Sanitary District of Chicago; bids April 11.

2100 tons, plant, Chicago, for R. R. Donnelley & Sons; Patrick Warren Construction Co., Chicago, contractor; new bods April 9.

954 tons, sewer work in Queens Borough, New York; Anthony Catapino, general contractor.

775 tons, paper mill, Battle Creek, Mich., for Michigan Carton Co.; Herlihy Mid-Continent Co., Chicago, contractor.

575 tons, veterans hospital, Providence, R. I.

350 tons, building, Lansing, Mich., for Michigan State College.

300 tons, sewer work in Bronx Park, New York.

250 tons, expansion, Milwaukee, for Borden Co.

210 tons, addition, North Chicago, Ill., for Abbott Laboratories; bids April 3.

150 tons, expansion, Kansas City, Mo., for American Dairies Co.

145 tons, lock and guide wall extension, dam No. 21, Quincy, Ill., for U. S. Engineer; bids April 12.

107 tons, lock and guide wall extension, dam No. 11, Dubuque, Iowa, for U. S. Engineer; bids April 16.

PLATES . . .

PLATES PENDING

100 tons or more, one 300,000-gallon, one 150,000-gallon and one 80,000-gallon, welded water tanks, fabricated complete and delivered knockdown for field erection by government, water-supply system, Grand Coulee power plant, Columbia Basin project, Wash-

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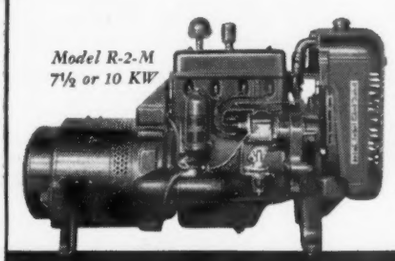

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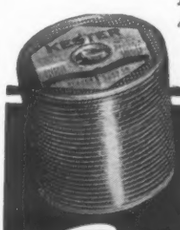

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Chesapeake & Ohio, 50 caboose cars, to American Car & Foundry Co., New York.

Chicago, Milwaukee, St. Paul & Pacific, 6 lightweight streamlined passenger trains, with sleeping cars, to be built by Pullman Standard Car Mfg. Co., Chicago, and remaining miscellaneous coaches to be built by the railroad's own shops in Milwaukee; each train will consist of 12 cars, comprising a mail car, a combination baggage and dormitory car, four coaches, a diner, a recreation-lounge car, three sleeping cars, and an observation compartment-drawing room car.

Kansas City Southern, two aluminum dining cars, to American Car & Foundry Co., New York.

Seaboard Airline, 200 phosphate cars, to Pullman Standard Car Mfg. Co., Chicago.

Wabash, sixty 70-ton hoppers, to American Car & Foundry Co., New York.

RAILROAD CARS PENDING

Missouri Pacific, 288 freight cars equipped to handle automobile parts; permission to purchase granted by federal court.

CONSTRUCTION AND ENTERPRISE

ARKANSAS

EL DORADO, ARK.—Lion Oil Co., El Dorado, plans a 4500-barrel catalytic cracking unit for high-octane gasoline, furnace oil, etc., to cost over $750,000.

FORT SMITH, ARK.—American Can Co., 104 South Michigan Ave., Chicago, plans a can factory here to cost about $1 million.

CALIFORNIA

EMERYVILLE, CALIF.—Merchant Calculating Co. is having plans drawn for $1,500,000 plant expansion at Powell and Lendregan Sts. Albert F. Roller, Crocker First National Bank Bldg., San Francisco, is architect.

INGLEWOOD, CALIF.—McCulloch Aviation Inc., will build a plant structure 51 x 151 feet at 6101 West Century Blvd., to cost about $40,000.

LOS ANGELES—California Metal Enameling Co., East 51st St., is having plans drawn for a factory building on East Slauson Blvd., 180 x 280 feet.

LOS ANGELES—Transmission Exchange Co., 1246 South Flower St., will build a plant at 3428 South Grand Ave., 120 x 175 feet, to cost about $47,500.

LOS ANGELES—Zonnie Electric Tool Co. has building permit for a plant addition at 2226 South San Pedro St., 42 x 90 feet, to cost about $15,000.

LOS ANGELES—Steel Furniture Mfg. Co., 1020 East 59th St., has permit for a plant building at 1900 Bonita St., Baldwin Park district, to cost about $22,000.

ONTARIO, CALIF.—Bestile Mfg. Co., has building permit for plant building 40 x 400 feet at 419 South Sultana Ave., to cost about $100,000.

SAN FRANCISCO—American Meter Co., 471 11th St., has let contract to Fred W. Schell, 666 Mission St., for a one-story plant building to cost $152,000. John H. Devitt, 580 Market St., is architect.

IDAHO

BOISE, IDAHO—International Engineering Co., Denver, subsidiary of Morrison-Knudsen Co., is preparing plans for a proposed hydroelectric and irrigation project on the Sutlej river, Punjab, India, to bring 4 million acres under irrigation.

ILLINOIS

BLUE ISLAND, ILL.—Illinois Brick Co., 228 North LaSalle St., Chicago, has plans for a one-story 200 x 250-foot brick manufacturing plant here.

CHICAGO—Armstrong Bros. Tool Co., 317 North Francisco Ave., has let contract to J. Emil Anderson & Son, 1809 Balmoral Ave., for a one-story 260 x 480-foot and 70 x 250-foot plant, to cost over $500,000.

CHICAGO—LaVezzi Machine Works, 180 North Wacker Drive, has let contract to R. C. Todd, 4310 North Marmora St., for a one-story 122 x 126-foot plant building estimated to cost about $61,000. E. H. Nordlie Co., 111 West Washington St., is architect.

KANKAKEE, ILL.—James Bradley Mfg. Co., has let general contract for a one-story 300 x 600-foot and 180 x 220-foot plant building to Algot Larson Co., 3837 West Lake St., Chicago. E. O. Sessions & Co., 1 North LaSalle St., Chicago, are architects.

SPRINGFIELD, ILL.—Sangamo Electric Co., 1301 North Eleventh St., has let contract to the Austin Co., 510 North Dearborn St., Chicago, for a one-story and a four-story plant buildings.

INDIANA

EVANSVILLE, IND.—Servel Inc. has building permit for a plant addition 177 x 125 feet, to cost about $50,000, for resumption of cabinet and refrigerator unit assembly.

MUNCIE, IND.—Owens-Illinois Glass Co., T. Collins, manager, Macedonia Ave., plans a new furnace building, batch building and remodeling present plant. Contract to the Austin Co., 16112 Euclid Ave., Cleveland. Cost estimated at $250,000.

PERU, IND.—Victory Ordnance Corp., Ralph L. Longden, president, has bought the Navy shell loading plant near here and will operate it as the Central Railway Signal Co.

SOUTH BEND, IND.—Fabricated Steel Products Inc., 2025 South Main St., has been incorporated with 1000 shares no par value to manufacture machinery and tools, by Byron D. Whiteman and associates.

IOWA

FORT DODGE, IOWA—City is having plans prepared by Buell & Winter, Sioux City, Iowa, for improvements to sewage disposal plant, to cost about $400,000.

LOUISIANA

NEW ORLEANS—Sewerage and water board, 526 Carondelet St., will open bids April 30 for three 4000-hp water-tube boilers for waterworks plant, coal pulverizers, forced and induced draft fans and air preheaters.

MARYLAND

BALTIMORE—Western Electric Co., 194 Broadway, New York, has let contract to Consolidated Engineering Co., 20 East Franklin St., for a one and two-story 368 x 660-foot cable building and 200 x 425-foot wire building, estimated to cost about $2 million.

MASSACHUSETTS

DANVERS, MASS.—Sylvania Electric Products Inc., 60 Boston St., Salem, Mass., will let contract soon for one-story 200 x 400-foot warehouse to cost about $150,000.

MICHIGAN

ALBION, MICH.—Union Steel Products Co.

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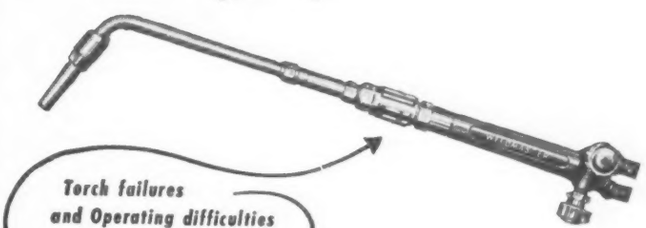

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MODERN ENGINEERING COMPANY, Inc.
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has let contract to Granger Bros., Lansing, Mich., for a plant building estimated to cost $100,000. Giffels & Vallet, 1000 Marquette Bldg., Detroit, are architects.

DETROIT—Micro Grinding Corp., 8623 Van Dyke Ave., has been incorporated with $50,000 capital to do grinding work. by G. A. McGeorge, 1155 West McNichols Rd.

DETROIT—Prospect Die & Mould Inc., 10526 Mack Ave., has been incorporated with $25,000 capital to manufacture dies, by Bertalian Zoltan, 16044 Fordham Ave.

DETROIT—Porto Pump Inc., 2491 Beaufait Ave., has been incorporated with $90 000 capital to manufacture pumps, motors and parts, by Walter W. Schmitt, same address.

DETROIT—Acco Corp., 915 Lafayette Bldg., has been incorporated with $100,000 capital to manufacture metal products, by A. C. Carlson, 3818 Audubon Ave.

DETROIT—Mel Shane Inc., 2045 East Eight-mile Rd., Baseline, has been incorporated with $50,000 capital to manufacture machine parts, by Mel Shane, 2281 West Grand Blvd., Detroit.

DETROIT—Russell Machine Co. Inc., 6538 Jos. Campau Ave., has been incorporated with $20,000 capital and 30 000 shares no par value to manufacture machinery, by H. G. Lount, 829 Burlingame Ave.

DETROIT—Production Steel Coil Inc., 3900 Beaufait St., has been incorporated with $50,000 capital to manufacture products from steel coil, by Maxwell Jospey, 731 Covington Drive.

DETROIT—Hercules Welding & Mfg. Co., 5420 Oakman Blvd., has been incorporated with $50,000 capital to operate a welding and machine shop, by John T. Gilmer, 5272 Trumbull Ave.

KALAMAZOO, MICH.—Kalamazoo Steel Castings Co., 2220 Lane Blvd., has been incorporated with $350,000 capital to manufacture castings, by Ralph M. Fisher, 420 Vine St.

MELVINDALE, MICH.—Hornet Reamer Corp., 2521 Oakwood Blvd., has been incorporated with $45,000 capital to manufacture reamers and cutting tools, by James Pace, 11107 Worden Ave., Detroit.

MT. CLEMENS, MICH.—Macomb County Drainage Commission, Mt. Clemens, has petitioned state for 8½ miles of four to 12-foot drain to Lake St. Clair, estimated to cost $3,250,000. W. C. Harper, Mt. Clemens, is commissioner.

NORTHVILLE, MICH.—Northville Foundry & Mfg. Co., 420 East Cady St., has been incorporated with $100,000 capital to operate a foundry, by James D. Friel, 8300 Roselawn Ave., Detroit.

PLAINWELL, MICH.—Valley Metal Products Corp., East Bridge St., has been incorporated with $100.000 capital to manufacture window frames and sash, by Richard H. Stiles, Plainwell.

PONTIAC, MICH.—Metal Building Products Inc., 227 Cherokee Rd., has been incorporated with $50,000 capital to manufacture metal building products, by Wallace O. Leonard, 1023 Yarmouth Rd., Birmingham, Mich.

PONTIAC, MICH.—Superior Die & Stamping Co. Inc., 71 Elm St., has been incorporated with $100,000 capital to manufacture steel products, by Alfred M. Carlsen, 1255 Dorchester St., Wards Orchard, Mich.

ROYAL OAK, MICH.—Hillman Tool & Die Corp., 322 Washington Square Bldg., has been incorporated with $50,000 capital to manufacture tools, dies and machinery, by Paul J. Hillman, 1344 Davis Ave., Birmingham, Mich.

MINNESOTA

MINNEAPOLIS—Central Motor Machine Shop, 2007 Central Ave., has let contract to Kraus-Anderson Inc., 501 South Eighth St., for a one-story machine shop 60 x 105 feet, to cost about $75,000. G. W. Shifflet, 82 South Ninth St., is architect.

MINNEAPOLIS—Super Six Mfg. Co. Inc., 2007 Central Ave., D. F. Hamacheck, president, has let contract to Kraus-Anderson Inc., 501 South Eighth St., for a one-story 80 x 150-foot plant building, to cost about $80,000. G. W. Shifflet, 83 South Ninth St., is architect.

MISSOURI

KIRKVILLE, MO.—City, A. L. Bartlett, mayor, plans a sewage disposal plant costing about $275,000. J. W. Shikles & Co., Reliance Bldg., Kansas City, Mo., are consulting engineers.

ST. LOUIS—J. Pavelka, 636 Tower Grove Ave., has let contract to W. C. Harting Construction Co., 722 Chestnut St., for a machine shop addition to cost about $40,000.

ST. LOUIS—Pittsburgh-Erie Saw Corp., 1569 Tower Grove Ave., has let contract to William H. & Nelson Cunliffe Co., 3320 Lindell Blvd., for a one-story 50 x 250-foot plant building, to cost about $100,000, with equipment.

ST. LOUIS—Sterling Aluminum Products Co., 2940 North Market St., has let contract to John Hill Construction Co., 915 Olive St., for a one-story 33 x 80-foot plant addition at 2830 Magazine St.

ST. LOUIS—Chase Bag Co., F. H. Ludington, president, 928 Spruce St., has let contract to Fruin-Colnon Contracting Co., 1706 Olive St., for a one-story 100 x 180-foot and 180 x 225-foot plant at 5033 Southwest Ave., to cost about $400,000.

ST. LOUIS—Carter Carburetor Co., 2840 North Spring Ave., has let contract to L. O. Stocker Co., 812 Olive St., for a four-story plant addition, estimated to cost $100,000, with equipment. Edward J. Lawler, 812 Olive St., is architect.

NEW YORK

LARCHMONT, N. Y.—Department of public works, Town Hall, has plans for an addition to sewage treatment plant, to cost about $35,000. I. M. Glace & Associates, 22 East 22nd St., Harrisburg, Pa., are consulting engineers.

NORTH CAROLINA

LEXINGTON, N. C.—City has FWA advance of $136,000 for a million-gallon steel tank and tower.

OHIO

AKRON—B. F. Goodrich Co. has let contract to Batson-Cook Co., West Point, Ga., for a plastics processing plant near Marietta, O., to cost about $4 million. Site of 66 acres on Muskingum river will contain main building covering 120,000 square feet and auxiliary structures covering 44,000 feet. H. E. Cook is chief engineer and W. B. Thompson is field engineer.

BARNESVILLE, O.—City, City Hall, plans a sewage treatment plant addition to cost about $79,000.

CINCINNATI—Gruen Watch Co., Iowa St., will let contract soon for plant additions to cost about $1 million. A. M. Kinney Inc., Enquirer Bldg., is architect.

CLEVELAND—Cralloy Mold & Pattern Co., recently formed by Anthony F. Simandle, 11130 Glenboro Dr., and associates, plans a plant on East 93rd St.,

CLEVELAND—Kemko Centerless Grinding Co. is being organized by group represented by O. H. Johnson, attorney, Union Commerce Bldg., to do high precision grinding.

CLEVELAND—Frontier Steel Co., manufacturer of roofing, air conditioning and heating supplies, will locate at 3519 St. Clair Ave. R. E. Relyea, care J. M. & L. A. Osborn Co., 1541 East 38th St., is interested.

CLEVELAND—Kromex Corp., 3634 Euclid Ave., E. M. Asquith, president, has bought plant No. 2 formerly operated by Cleveland Graphite Bronze Co. at 880 East 72nd St. and will install equipment costing $50,000. Euclid Ave. plant will be retained.

CLEVELAND—Lucas Machine Tool Co., 523 East 99th St., has bought six acres on Kirby Ave. and has plans for factory and office building and power plant. George A. Yost is president of company, which manufactures horizontal boring, drilling and milling machines.

COLUMBUS, O.—Jeffrey Mfg. Co., 724 East First Ave., has let contract to E. Elford & Son, 555 South Front St., for a laboratory and research building, estimated to cost over $100,000.

CONNEAUT, O.—Michigan Limestone & Chemical Co., Buffalo, G. W. Mintz, manager, is considering bids for an agricultural limestone pulverizing plant here.

FINDLAY, O.—Ohio Oil Co., Findlay, plans a one-story 54 x 162-foot hangar to cost about $100,000. Wilbur Watson Associates, 4614 Prospect Ave., Cleveland, are consulting engineers.

McDONALD, O.—Ohio Cement Products Corp., recently incorporated, Frank Forney, Niles, O., president-secretary, is building a cement products plant costing $70.000 on a four-acre site adjoining slagbeds of Carnegie-Illinois Steel Corp., main building 40 x 104 feet and four kilns 54 x 85 feet.

PENNSYLVANIA

PHILADELPHIA—SKF Industries, Erie Ave. and Front St., has let contract to Turner Construction Co., 1500 Walnut St., for a plant addition to cost about $45,000.

RHODE ISLAND

PROVIDENCE, R. I.—Federal Bed Spring & Mattress Co., 1 Aide St., will take bids soon on a two-story 50 x 100-foot plant building on Cedar St., to cost over $75,000. V. DiMase, 201 Dean St., is architect.

TEXAS

DENISON, TEX.—Jacques Power Saw Co. will build an assembly plant to cost about $110,000.

WASHINGTON

GRANDVIEW, WASH.—Clyde E. Phillips, Seattle, is low bidder at $109,148 for construction of a municipal sewage disposal plant.

HOQUIAM, WASH.—Grays Harbor Chain & Mfg. Co. plans $20,000 boiler room plant addition.

WISCONSIN

KENOSHA, WIS.—American Brass Co., 1420 63rd St., has let contract to the Austin Co., 510 North Dearborn St., Chicago, for design and construction of a one-story plant addition 180 x 200 feet.

KENOSHA, WIS.—MacWhyte Co., 2906 14th Ave., has let contract to the Austin Co., 510 North Dearborn St., Chicago, for a one-story 20 x 120-foot shipping room and 80 x 120-foot reel shop.

LA CROSSE, WIS.—Trane Co., 206 Cameron St., has let contract to P. Nelson & Son Inc., 115 South Fourth St., for a one-story 100 x 120-foot plant addition.

MILWAUKEE—International Harvester Co., 1714 West Bruce St., has let contract to Dahlman Construction Co., 4200 North Palmer St., for a one-story 76 x 110-foot foundry addition.

MILWAUKEE—Dings Magnetic Separator Co., 509 East Smith St., has let contract to Peters Construction Co., 2640 North Humboldt Ave., for a one-story 125 x 200-foot machine shop and office building, estimated to cost $155,000. G. Schley & Sons, 735 North Water St., are architects.

"HERCULES" (Red Strand) WIRE ROPE

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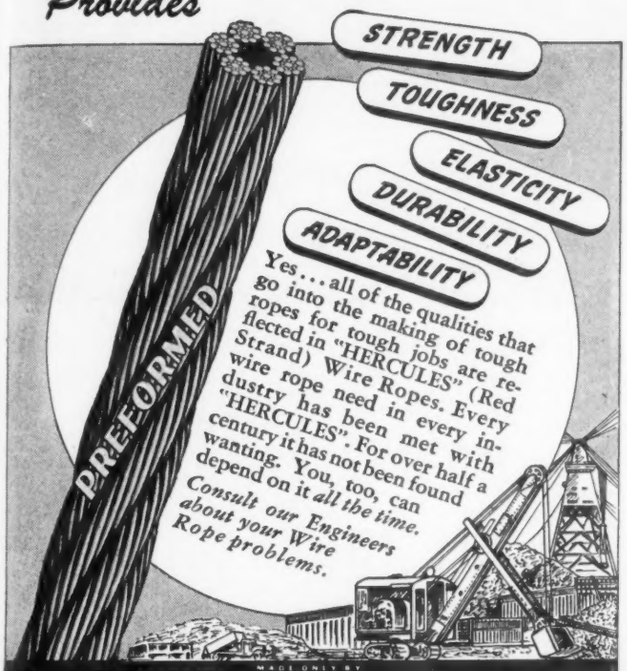
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$$17\tfrac{1}{16} \times \left(\tfrac{39}{8} \times \tfrac{53}{16}\right) = 17\tfrac{1}{16} \times \tfrac{2067}{128}$$

$$17\tfrac{1}{16} \times 16\tfrac{19}{128} = \tfrac{273}{1} \times \tfrac{2048}{128} = 275.5327$$

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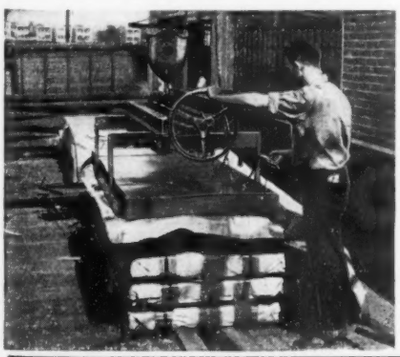

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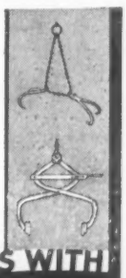

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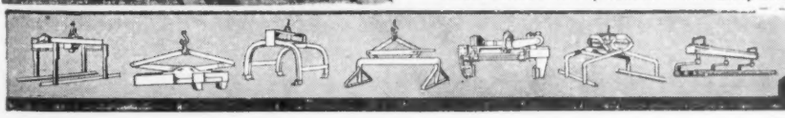

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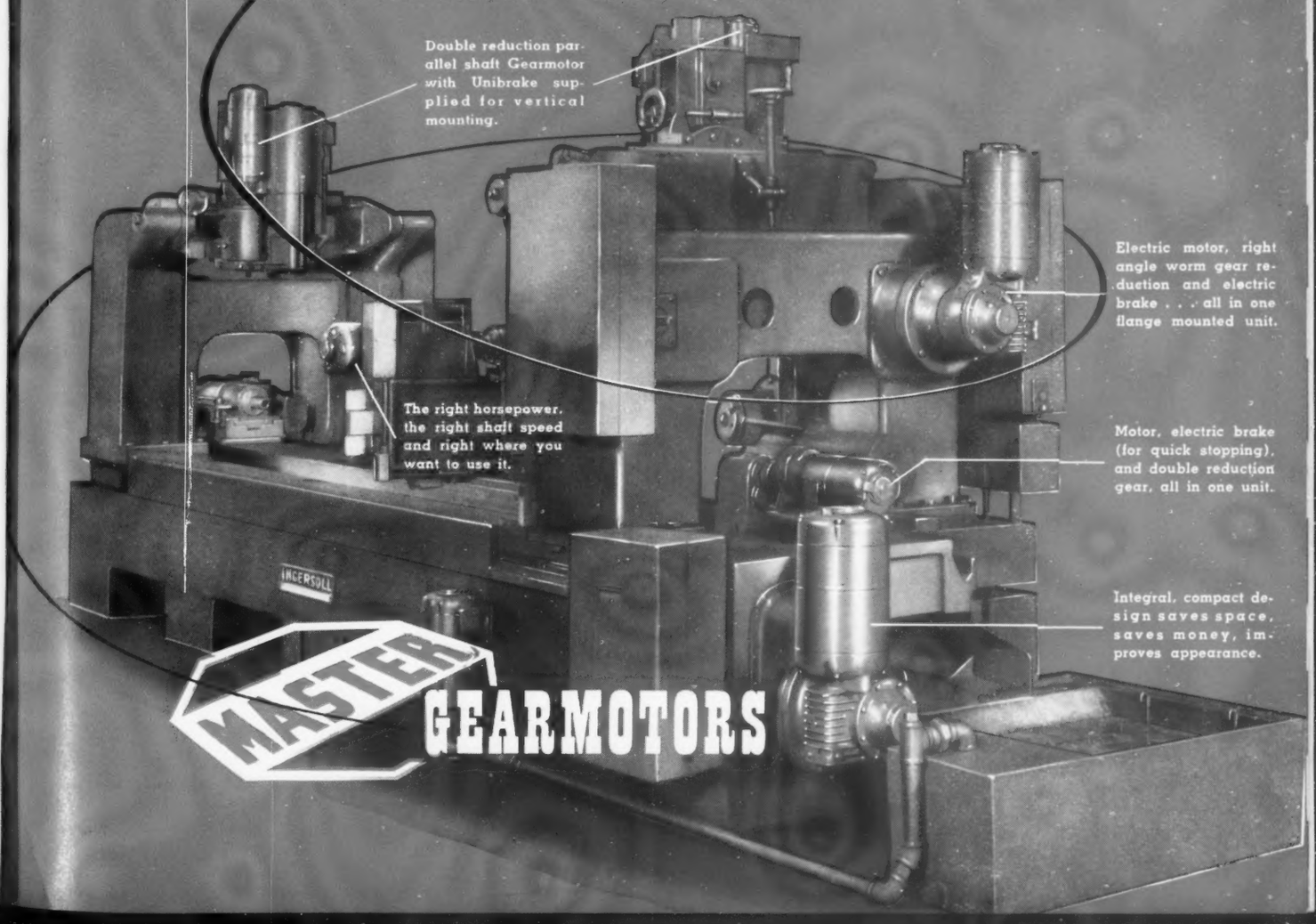
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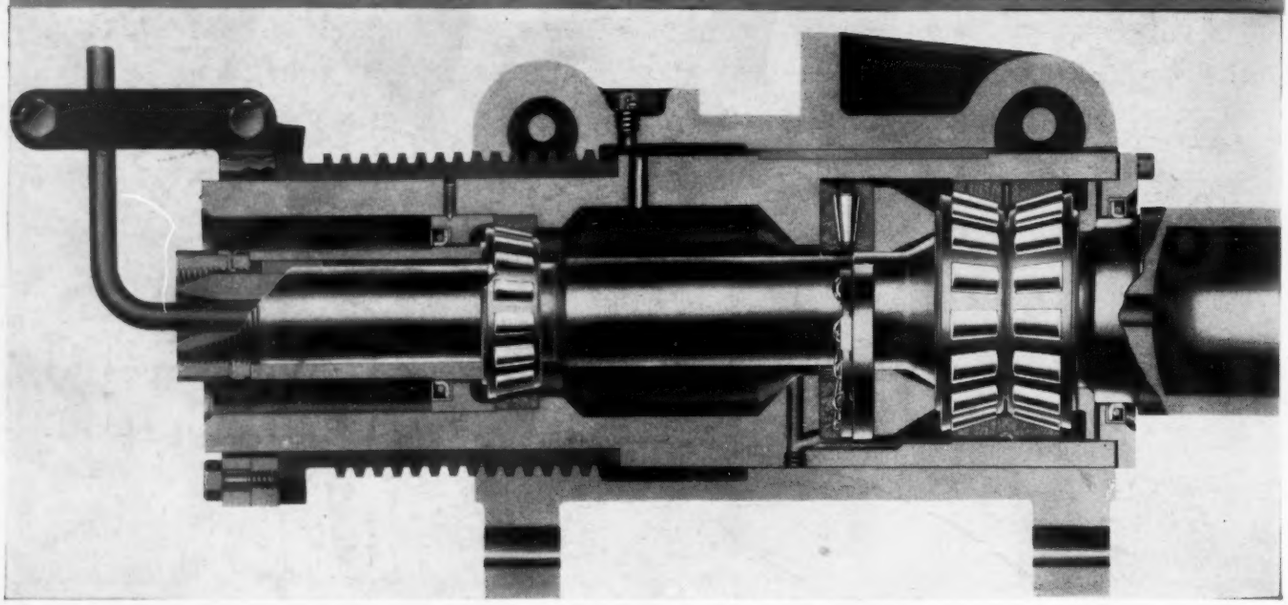

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